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Professional Bulletin 1-93-2

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March/April 1993

Aviation Digest

Professional Bulletin

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Back Cover: **Army's First Aerial In-flight Refueling, photos courtesy Boeing Vertol Company**

Cover: **To be competitive with its sister services in mission ready rates, the Army must "beef up" its maintenance re-sourcing—both the number of maintainers and the man-hours available for aircraft repairs. The lead article, starting on page 8, discusses how—new training approaches, command emphasis, manpower authorizations, and revised thinking on "high-tech" weapons systems and the people who keep them working. Another how—the new ULLS-A system, pages 11-20.**

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Major General Dave Robinson

Army Aviation's Decade Of Progress

A decade of tremendous progress marked the 10th anniversary of Army Aviation as a combat arms branch in the U.S. Army on 12 April 1993. We have seen a complete evolution in the past decade from a fledgling branch to a solid, respected member of the combined arms team. No longer are our aviators, crews, maintenance personnel, and air traffic controllers "on loan" to aviation units as temporary help with competing branch interests. We have established a vigorous, energetic, and professional branch of warfighters in the combined arms team!

Today's world is changing rapidly and concerns of greater lethality at all levels of conflict, global technology proliferation, and third world instabilities cause us to continually reevaluate our national military strategies. Our strategic foundations provide for a power projection force from a continental United States-based force of Active and Reserve Component soldiers who are capable of being rapidly deployed should deterrence fail. Army Aviation gives America's Army the organic capability to shift into the third dimension . . . the third dimension as it applies to land force dominance in the ground regime. Army Aviation provides multiple contributions to the essentials of land force dominance such as projecting combat power, protecting and sustaining the force, winning the battlefield information war, conducting precision strikes, and dominating the maneuver battle. We do that as warfighters in the combined arms team. A quote I favor, by T. R. Fehrenbach, makes it so very clear, "You may fly over the land forever, bomb it, atomize it, wipe it clean of life; but, if you desire to defend it, protect it, or keep it for civilization . . . you must do this on the ground by putting your young men into the mud."

We are warfighters, fighting Army Aviation in the ground regime by compressing time and space with speed and agile platforms. Aviation gives the ground force commander enormous capability and flexibility, whether involved in humanitarian efforts or warfighting missions. Aviation brings reality to the tenets of airland battle; initiative, fighting in depth, agility, flexibility, and battle synchronization. Global mobility through strategic airlift and self-deployment gives us the capability to be anywhere in the world in a matter of hours. Aviation helps the commander to "see" the enemy and sense his "intent." This capability allows the commander to apply decisive, lethal forces across the length and breadth of the battlefield.

Army Aviation has tuned its ability to deploy and fight the force. Operations such as screen, guard, cover, armed reconnaissance, target acquisition, situational awareness, and rapid decision making are critical for the maneuver commander whether in the close or deep fight. We have mastered this art; indeed, we often are asked to conduct these operations simultaneously. As an integral component of the combined arms team, our focus has been on concepts for warfighting and changes to our doctrine. We are harnessing the full power of the total force—active and reserve aviation elements, supporting a contingency-oriented Army. No longer just aviators, our leaders are bold, agile-minded, and intuitive. They have earned their spurs in the "Spirit of the Cavalry." We are maximizing our potential to contribute to the battle with leaders who have tactical and operational literacy.

Proud announcement of our warfighting capabilities is para-

mount in the promotion of our branch as we skillfully exploit the third dimension. Our OH-58D Kiowa Warriors and AH-64 Apaches provide our ability to focus lethal fire and obtain decisive victory by placing steel on target with first-round accuracy. Their capabilities in the missions of armed reconnaissance, security, and attack are simply unchallenged. Our UH-60 Black Hawks and CH-47D Chinooks provide unparalleled air assault and medium-lift capability, offering commanders considerable staging and sustainment options. The MH-60K and MH-47D provide special operations forces with the ultimate in high technology, self-deployable aviation systems with which to carry out strategic-level missions. Our UH-60Q Medical Evacuation Black Hawk represents considerable advancements in rapid transport of battlefield casualty evacuation. Our RC-12 Guardrail aircraft provide state-of-the-art intelligence-gathering capabilities to aid commanders in "seeing" the enemy on the battlefield. These modern, high-technology aircraft combined with trained and ready warfighters provide America's Army with the best possible total force.

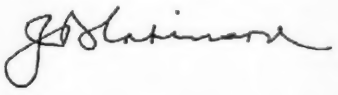
We live in an era of phenomenal sophistication in simulations and technology. Truly exciting capabilities exist and are being tapped by America's brightest minds to harness the power of the microchip and turn concepts into reality. Enhancement of combat developments and realistic training through mobile trainers, simulations integration, mission rehearsal equipment, and virtual reality simulation simultaneously reduces production and training costs needed for a small but high-technology force of the future. That force is Army Aviation. Simulations are contributing heavily in the development of the RAH-66 Comanche, our flagship for the next century.

The Army Aviation Warfighting Center, Fort Rucker, AL, vigorously provides the training and leader development skills needed to create a branch of combined arms warfighters. Team training concepts in the Officer Basic and Advanced Courses, the Warrant Officer Career Center, and in our enlisted training courses focus our soldiers to serve as members of the combined arms team. A major accomplishment is the integration of Aviation Branch soldiers serving in traditionally nonaviation positions of significant responsibility. Recognition by other members of the combined arms team with equal parity has been an uphill battle, yet we have made it happen by our combined arms warfighter focus.

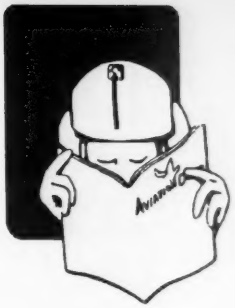
Army Aviation leads the way in force modernization initiatives. Our thrust is simple: reduce the number of aging and high-support cost airframes by replacing them with fewer, high-quality systems. The movement from 10 helicopters to 5 modern, fightable, and sustainable systems (the AH-64, OH-58D, UH-60, CH-47D and RAH-66) will carry us into the next century. We must get the fixed-wing fleet under control by trimming the numbers from 26 to perhaps 4 different types of airplanes. This divesture strategy will give us considerable savings in support costs and ensure that we are putting only the best and most fightable systems on the battlefield.

In this time of downsizing and restructuring, Army Aviation leads the way in taking care of our soldiers and their families. While there are significant challenges ahead, there are also significant opportunities. There are tremendous opportunities for women and minorities to enter and serve within Army Aviation. Cultural maturity and awareness are being championed by leaders and members of our combined arms team of warfighters. Our diversity and complexity as a branch that demands skill and professionalism promote shedding of stereotypical animosities.

I am extremely proud to be serving as the Army Aviation Branch Chief during this historic time. Our branch motto, "Above the Best," encompasses our status, our soldiers, and our equipment. We have earned our place in the combined arms team; our officers, warrant officers, and enlisted soldiers are the best of what our nation has to offer, and our high-technology warfighting systems are the leading edge of America's Army. Our 10th anniversary as a branch leaves us as winners and victors. The Cold War is behind us; and now, we must look forward to the challenges of the 21st century and the future. What we do today shall determine where we shall be as we cross the threshold into the next century. We accept that challenge, because warfighting is our business . . . and don't you forget it!



Views From Readers



Editor:

While reading Captain(P) Brian Boquist's article, "Will the Pentagon's Proposed Force Mix Meet the Future Threat?," in your September/October 1992 issue, I noticed several recurring errors about the initial deployment operations during Operation Desert Shield. First, the 82d Airborne Division (Abn Div), Fort Bragg, NC, was referred to as a light division. It is not even remotely structured along the lines of an Army light division. The following "abbreviated" chart highlights some of a light division's armor "killing" systems versus some of the 82d Abn Div's, and should clarify this point.

System	82d Abn Div	Light Div
Ground TOW2 (3,700m)	108	44
AH-64 Apache w/ HELLFIRE (8,000m+)	18	0
AH-1 Cobra w/TOW2 (3,700m)	12	26
M551 Sheridan (3,700m) (w/gun and missile systems)	54	0

Although this doesn't address all the antiarmor systems in either organization, it clearly shows that the 82d Abn Div has an impressive "tank" killing arsenal. Add to this that all these systems are equally as effective at night as they are during the day, and that they out range the Iraqis' best tank gun system (T-72M), and you have a much better picture of the "delaying" capability of this division against an armor force. Also, as normal during a deployment, the 82d Abn Div took with its initial brigade its Corps' slice of 155 and multiple launch rocket system artillery.

Second, it was mentioned that "everybody held his breath and prayed" that the Iraqis wouldn't come south. More accurately, we wargamed the possible scenarios every day and night to be adequately prepared should they attack. The tactical depth of the battlefield from the Saudi Arabian-Kuwaiti border to Al Jubayl, Saudi Arabia (the first port we were required to deny to the Iraqis), is about 150 miles. We felt with the enemy limited to one major avenue of approach and stretched over such a distance that the ground forces would attrit him heavily at night and the U.S. Air Force, Navy, and Marine Air Forces would do so during the day. That, coupled with the Iraqi Army's operational techniques, limited logistical projection capability, restrictive command and control apparatus, and inability to achieve even air parity, lent great credence to our ability to delay and dramatically attrit an Iraqi attack south, without "grinding infantry under the tank tracks of Soviet-made armor."

This does not mean we weren't apprehensive about the potential outcome of such a confrontation while we were still in the first weeks of our buildup. Confronted by the "4th largest army in the world," the U.S. leadership had intentionally projected combat power into the operational area (OA) early in the force flow, even though they knew there was virtually no logistical infrastructure to support those systems once on the ground. "Win through intimidation...," make the enemy blink, and you gain the advantage! When the enemy "blinked," we injected enough sustainment to remove any possibility of an Iraqi attack into Saudi Arabia.

Now that we can "Monday morning quarterback" the overall operation, many suggest that there were better ways to have executed both Operations Desert Shield and Storm. The fact is, they're right! If we had to do it again, rest assured the lessons learned from moving a half-million-man force and the logistics to support it into an OA, defend and

then attack against a force touted to be one of the world's best, and then remove our forces from the OA, all virtually within a 12-month period, would be used to improve our operations. But, if we're going to "Monday morning quarterback," it's important to have a good grasp of the facts on which we base our suppositions. We would not have requested more TOW systems as you suggested, but we would certainly have requested that the 101st Abn Div and the 24th Infantry Division (Mechanized) receive sufficient lift to arrive in theater earlier.

The lesson here is you don't need bad information and wrong conclusions to make good points about contingency forces and their utility.

MG Edison E. Scholes
Deputy Commanding General
XVIII Airborne Corps and
Fort Bragg
Fort Bragg, NC

Editor:

The following information is provided to assist other infantrymen and attack Aviation crews during air-ground operations with AH-64 Apache attack helicopters.

During recent field training with 2-101st Attack (Atk) Battalion (Bn) (AH-64A), 1-187th Infantry Regiment, Fort Campbell, KY, experimented with a variety of night ground recognition devices.

The intent was to find a signal or combination of signals that are best recognized by the AH-64's forward-looking infrared (FLIR) radar and commonly carried by the infantry squad. The results would be improved risk reduction and the possible elimination of items from infantry rucksacks that were already too heavy.

The experiment was conducted in early December 1992 on a relatively clear night. The 2-101st Atk Bn provided security for an infantry company air assault. The AH-64s were in overwatch 2.5 km north of the landing zone.

The scheme was for the air assaulting infantry company to mark its flanks on the landing zone with a series of signals and have the 2-101st Atk Bn judge which was best through the FLIR radar.

The signals were infrared (IR) chemlite wands, strobe lights with IR caps, multiple meals ready to eat heater pads (thermal return), and medic space blankets illuminated by the IR source on a pair of AN/PVS-7A night vision goggles (NVG).

Test results showed that the space blankets with NVG IR source were clearly superior to the other devices under both white/hot and black/hot FLIR radar viewing.

The space blanket is a readiness category 1 posture VIII item in the possession of all medics, most infantrymen, and in many aircrews' survival vests. There are over 60 pairs of AN/PVS-7As per rifle company and small IR sources are plentiful in Aviation units. These items are not only the best recognition combination, but also are the most plentiful at unit level.

Hopefully this information can help both infantrymen and AH-64 crews as they go about their missions.

LTC Peter C. Kinney
Commander, 1st Bn, 187th
Infantry Regiment
Fort Campbell, KY

Editor:

Fiscal year (FY) 1993 is here, and where are we on Special Technical Inspection and Repair (STIR)?

As part of STIR, the U.S. Army Aviation and Troop Command (ATCOM), Directorate of Maintenance, St. Louis, MO, is responsible for doing maintenance on those aircraft that saw action in Southwest Asia (SWA).

Those tasks are modified work order incorporation phase maintenance, STIR discrepancies, and deferred maintenance on helicopters in SWA.

What is STIR? It is the process by which we take force modernized aircraft that participated in Operations Desert Shield and Storm, open the aircraft, complete the maintenance tasks, and return the aircraft to the unit in predeployment condition.

We have found and removed several pounds of sand from assessment aircraft at Fort Hood, TX. The sand from SWA was as fine as talcum powder! When water was added in the washing process, this

Worldwide Update

Type Aircraft (Acft)	Total Program	Percent Inducted	Completed Acft	Percent Completed
AH-64 Apache	303	34	64	21
CH-47D Chinook	182	45	48	26
OH-58D Kiowa	88	43	19	21
UH-60 Black Hawk	512	39	106	20
Total	**1,085**	**39**	**237**	**22**

sand turned to a paste or mud compound. If this sand is not removed, the contents of which is highly corrosive, the aircraft will deteriorate to an even worse condition.

Although we've come a long way, we've got a busy year ahead and a long way to go to complete the program on schedule. The worldwide update on the force modernization system is at left bottom of page.

Readiness is our goal. We have the momentum going and are marching out smartly. Although most of our personnel and facility problems are in the past, we are continually adjusting our assessments and changing induction projections at the STIR sites to meet the daily challenges of aircraft repair. Aircraft inductions are the real key to completing our overall goal. This facilitates the assembly line process, which helps to maintain a shorter turnaround time of aircraft.

By taking advantage of a unique U.S. Air Force (USAF) maintenance contract, we have access to a virtually unlimited source of highly trained technical personnel. The USAF administers the contract and the STIR operations center at ATCOM coordinates aircraft movement, repair, and logistics support for the five major STIR sites within the continental United States and Europe.

These STIR sites and points of contact are U.S. Army, Europe (Germany and Italy), Mr. Chuck Ameigh; Fort Campbell, KY, Mr. Steve Ebersole; Fort Carson, CO, Mr. Tom Cook; Fort Hood, TX, Mr. John Evans; Fort Lewis, WA, Mr. Jim Bush; and Hunter Army Airfield, Mr. Dale De Roia.

The heart and soul of STIR operation is the Central Logistics Support Center, ATCOM. The center is a "one-stop" data base to requisition, track, and expedite the worldwide requirements as initiated by individual STIR sites.

A repository of aircraft history and repair parts of demand data by aircraft tail number is maintained. The data are used to forecast current and future material requirements. This is home of the STIR project manager, deputy, production control officer, and STIR logistics project officer. These support officers are Lieutenant Colonel Charles L. Crossan, Project Manager; Captain Donald Hazelwood, Deputy, Project Manager; CW3 Mike Fry, Production Control Officer; and Mr. Dennis Yeargain, Logistics Project Officer.

Project STIR is the largest Army Aviation field maintenance project ever undertaken. We are dedicated to provide the best product at cost, on time, and not sacrifice quality.

As part of STIR, we have inducted over 39 percent of our program goals. This equates to 37 percent of the total force modernization aircraft in SWA. With the anticipation of a nonforce modernization program in FY 93, we have a very busy year ahead of us.

Approximate dollar figures for FY 92 were $235 million, $85 million for labor, and $150 million for parts. With 60 percent of the aircraft to be inducted in FY 93 completed, we project a more aggressive and even faster pace will be required to complete STIR as scheduled. So, as you can see, much planning, communication, and hard work is ahead of us. Customer satisfaction is the norm.

Readiness to the soldier today equates to mission success tomorrow!

The phone numbers and DATAFAX for the STIR support center are DSN 693-9029 (logistics), 693-1103 (production); commercial DATAFAX 314-263-2926 or DSN 693-2926.

Mr. Dennis Yeargain
Logistics Project Officer
Project STIR
St. Louis, MO

Editor:

The 8th Battalion, 229th Aviation Regiment (Attack), an Army reserve unit at Fort Knox, Ky, is looking for qualified soldiers interested in joining the excitement! The unit is converting from AH-1 Cobra helicopters to the more advanced AH-64 Apaches.

While opportunities are available for aviators (including aeroscout observers—a flying position for qualified enlisted soldier), many nonflying jobs also are available.

Apache gives "weekend warrior" a whole new meaning for the U.S. Army Reserve. Let us do the same for you!

If you are in the Fort Knox area or are planning to move into the area and possess an aviation military occupational specialty or are qualified to be retrained please call commercial 502-624-6739/4632.

Robert H. Windle
Administrative Officer

Editor:

The Royal Air Force and the U.S. Air Force history programs are jointly sponsoring the 1993 Air Power Symposium on 9 and 10 September 1993 at Bolling Air Force Base (AFB), Washington, DC.

The theme is "Anglo-American Air Power Cooperation during the Cold War Era."

Three panels will feature papers by scholars as well as participants on policy decisions, acquisition, and crisis response.

Seating is limited, so those interested in attending should register early.

For further information, contact Dr. Roger G. Miller, Center for Air Force History, Building 5681, 170 Luke Avenue, Suite 400, Bolling AFB, DC 20332-5113, or call commercial 202-767-4713.

Editor:

It is amazing to me how much leadership has changed in the last few years in the Aviation maintenance field. The problem became clear to me as I was counseling my former platoon sergeant on his performance. I had been platoon leader and maintenance

technician for about 5 weeks and had been watching how the platoon operated and the production accomplished by shop personnel. In the 5 weeks I had monitored them, the platoon managed to produce only 1.5 direct manhours labor on work orders in the shops per week. This number was not per man, but for the entire platoon.

Work got done only because we used contract and civilian labor. The soldiers assigned never got to work in their military occupational specialty (MOS). To be able to do what they were trained to do on aircraft was impossible. The major workload of the platoon was the engine shop, mostly at the military engine test stand where we test ran the overhauled engines. We kept a backlog of 60 or more engines with at least 45 of them waiting on a test run.

During this 5-week period, I assigned the men with engine specialties to those engines whenever possible. One of them had been assigned here more than 5 years. When I directed him to run an engine test, he could not perform the task if any problem at all arose either with the engine or the test cell. He was a noncommissioned officer (NCO) and the platoon's most experienced test cell operator.

Because of the lack of proper use of personnel and the low technical knowledge level of the platoon, I counseled the platoon sergeant (PSG), telling him I was disappointed with the way the platoon was performing. I wanted people working in their MOS and he, the trainer of the platoon, was responsible for their technical knowledge. The PSG became upset and said he was a good manager, the best in the company, and I was being unfair in wanting him to train troops on the technical aspects of their jobs. The reason he felt that way was because he did not know the technical side of his job. The more I think about it, I have to admit that he was a good manager; the only problem was we needed leaders not managers.

Field Manual (FM) 22-100, *Military Leadership*, was the manual I was taught to use to lead. It tells a PSG how to do his job. Somehow the job seems to have changed so that PSGs and platoon leaders think their job is an administrative function, and that they should manage the platoon. This is far from true. Platoon leaders can be managers, but they must be leaders. They must lead by example, as outlined in FM 22-100. They are supposed to be examples for their troops. Platoon leaders need to know what they want their troops to know, whether it be how to put on and wear a gas mask or how to put an insertion patch on a UH-60 Black Hawk.

One of the 11 leadership principles is to be technically and tactically proficient. In Aviation maintenance, technical proficiency is essential to leadership. A PSG proficient in the use of each weapon, vehicle, and piece of equipment in the platoon is a must.

In a tank platoon, we would not allow a man to remain a PSG if he could not drive a tank or perform the required preventive maintenance. Yet, in Aviation maintenance, we've allowed personnel who have no idea how to use test equipment in a platoon assigned test equipment to remain PSGs. How can they teach their troops when they lack the technical knowledge necessary for the job? Even this could be corrected; however, they often have no desire to learn because they are PSGs and managers. I have seen PSGs in this unit who could not drive a standard transmission truck. Yet they were required to have drivers in their platoon with this skill.

The training and testing of Aviation maintenance unit personnel were poor. Instead of training on tasks that were needed by the unit to perform its primary mission, we trained over and over on such secondary mission tasks as mapreading; nuclear, biological, and chemical (NBC) warfare tasks; M-16 assembly/disassembly, etc.

This would not have been so bad if we would have held the troops to standard. In NBC training, a soldier would go into the chamber, stand around, do a few side straddle hops, break the seal on his mask (without breathing), and then leave. There is little training value in that and no confidence training. The chamber training at least should require the person to drink from his canteen while inside. Ninety-eight percent of the troops had never done this. The first time a trooper has to do this should not be in a war, in a real NBC attack. We train troops to get into mission oriented protection posture gear in 8 minutes, but we let them put on their mask last. In the real situation, the mask will have to be first and our troops are not trained for that.

I also saw this unit do convoy operations for soldier qualification training; they used only three trucks with about 28 people. This looked good on the training schedule, but what training did 85 percent of the people get riding around in the back of a truck for 5 hours? Also, on the rifle range a time limit is set for firing all rounds. We allowed people who didn't shoot all their rounds in time, to shoot them any way and count them as hits. This was not what the alibi system is for (it is for weapons problems).

Aviation maintenance soldiers need to be trained on their mission essential task list (METL), not the METL for an infantry unit. We should have the basic device repair manuals and train on those tasks. We should train on aircraft recovery as sling loads, forward arming and refueling point operations, quick-fix maintenance to put aircraft back into the fight, airload operations, and reassembly of aircraft...things that would be required if we were called to war.

I tried everything I knew to do at least to get the platoon to which I was assigned turned around and headed in the right direction. It seemed like I was talking to a wall. I could change things for a day or week, but the minute I was not there things would go back to the way they were.

We have professional and efficient infantry and armor branches. Now that the Aviation Branch is a combat arms branch, our maintenance people must be trained to sustain the aircraft in combat. As aircraft become more and more technical, we must become more technically proficient as well. The Army seems to be depending, more and more, on contractors to solve maintenance problems. This works in peacetime but not in the middle of the battlefield. If we have another war soon, the lack of technical proficiency of Aviation maintenance soldiers will cost unnecessary lives. I pray that the leaders in the Aviation maintenance field wake up, hold NCOs to the standards of FM 22-100, put training in primary mission essential tasks in first priority, have the moral courage to stand up for what is right, and do what needs to be done. Don't let NCOs get away with not meeting standards just because they have a patch on their right shoulder, medals on their chests, or have been in a long time. Don't let them rest on their past laurels. If they are not up to the job, get rid of them. The cost in lives is worth more than their retirement pay. I retired because I could not change the way we were doing in my own former unit and I could not be a part of it and live with myself.

CW2 Herbert D. Carter
(Retired)
Former Aircraft Maintenance Technician
B Company, 70th Transportation Battalion
APO NY

Editor:

Tool Improvement Program Suggestions (TIPS) is a program designed to allow users of Army tools to submit their ideas for improving tool efficiency directly to the TIPS program manager for consideration. The program manager logs the suggester's idea into the computer and tasks the Army subject matter experts for their technical evaluation and, based on their findings, approves or disapproves the idea.

Input ideas are called initiatives. Suggesters may submit initiatives that recommend adding tools to a toolkit. Suggesters are urged to contact the local U.S. Army Tank Automotive Command Logistics Assistance Representative (TACOM LAR) before submitting initiatives on wheeled and/or tracked vehicles. This is necessary to preclude duplicate suggestions and save time. The TACOM LAR has the latest maintenance and tool information available and is charged with resolving problems for these vehicle systems.

Soldier and civilian users of Army tools, interested in improving productivity and conserving resources, should call Mr. Tom Justus at DSN 345-2513 or commercial 703-355-2513, or send a DATAFAX message to DSN 345-3252 or commercial 703-355-3252 for an information package and/or assistance before submitting initiatives.

Editor:

The prayer below came up out of a "maintenance field training exercise" with the help of several mechanics and other great soldiers.

May it be of some use to the Army Aviation community through the *Aviation Digest*. God Bless!

Helicopter Maintenance Prayer

O, dear God, you who watch over heaven and earth, watch over our rotors and nuts and bolts as well. Guide our wrenches to turn the right way. May our hammers always hit the right spot at the right time. And as we scramble, may our screwdrivers end up in the right place and may the hundred-mile-an-hour tape always hold. Lead us to that extra wisdom and skill so that we do get it right the first time: may we realize the strut is bad before we put the new wheel on; may we remember to get the correct inspection done before we put it all back together; and, Lord, please arrange the calendar just enough so we can complete the post-phase test flight before the next prephase test flight. Lord, could you also add this? Please help make it a good ride for our passengers and preserve them from knocking off the doors or jettisoning the windows. Good and gracious God, grant safe flight to our pilots, crews, and all who fly with us. Thank you for remaining at our side and saving us from harm. Bless us and our allies with a true and lasting peace. And may all our efforts build up that peace we wish for ourselves, our families and friends, and our country. AMEN!

Chaplain Edward M. Czech
Assistant Aviation (Avn) Brigade (Bde) Chaplain
Chaplain to 2d Battalion (Bn), 2d Avn
Senior Catholic Chaplain, 2d Infantry Division (ID)
Catholic Chaplain CFA (ROK/US)
Chaplain Jaime A. Thomas, Avn Bde Chaplain
<u>Avn Bde, 2ID</u>
COL James M. Pulliam, Commanding (Cmdg)
LTC Pierre D. Peltier
CSM Ronald L. Moore
<u>2d Bn, 2d Avn</u>
LTC Steve M. Dial, Cmdg
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CSM Marvin E. Home

Suspicions Confirmed

Low Man-hours, Low Readiness

Captain David Keller
Concepts and Studies Manager

and

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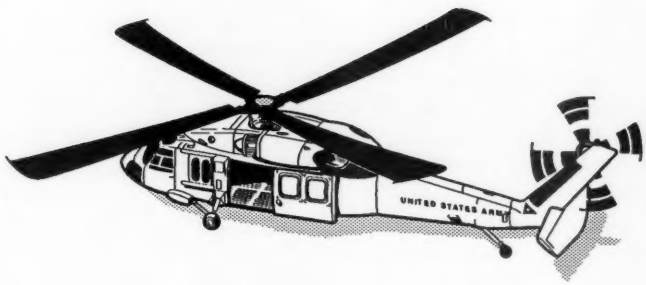

This article has information that all Aviation commanders, management types, and wrench benders want to read. Why? Because it confirms what you have been saying all along: Two of the most contributing factors to low aircraft readiness rates are the undermanning of maintenance people in Aviation units and the low amount of time our maintenance people work in their military occupational specialty (MOS). Granted these are not the only factors, but the U.S. Army Aviation Logistics School (USAALS), Fort Eustis, VA, has collected data that show they are at the top of the list.

The USAALS Directorate of Combat Developments has gathered manpower/readiness information from within the Army and from our sister services that shows a direct correlation between the resource priority put on maintenance support and the mission ready status of aviation units. The comparison centered on the UH-60 Black Hawk, since that type helicopter is used throughout the military services (Army–Black Hawk, Air Force–Pave Hawk [MH-60], and Navy–Seahawk [SH-60]). This article looks at the training approaches, command emphasis, manpower authorizations, and mission ready rates of typical UH-60 units in the three services.

Training

The Army conducts its UH-60 maintenance training at USAALS. Students initially attend a 13-week advanced individual training maintenance course, which teaches both general maintenance skills and specific Black Hawk systems/subsystems maintenance. Upon completion, graduates receive assignments to either an aviation intermediate maintenance (AVIM) unit, aviation unit maintenance (AVUM) company, or line (operating) company.

Ideally, graduates will first be assigned to an AVIM or AVUM unit to gain experience by working on phase teams or in the shops. However, personnel shortfalls often force units to place mechanics straight out of school into crewchief duties on the aircraft. This practice results in first-line maintainers who have little or no on-aircraft experience, which can, and often does, create maintenance support problems all the way up the line.

The next stage of the Army mechanic's formal training is attendance at the Basic Noncommissioned Officers Course. This 14-week course emphasizes general noncommissioned officer (NCO) leadership skills, followed by specific technical inspector training on the Black Hawk. Mechanics attend this course after promotion to E-5, or when promotable to E-6. Graduates of this course are subsequently assigned into "leadership" positions, as opposed to "hands-on" technical repair work.

Following promotion to E-7 maintenance personnel attend the Advanced Noncommissioned Officers Course and continue to serve in leadership positions. Leadership skills then serve as the basis for promotion to the senior grades, rather than technical proficiency. Unfortunately, the administrative burden of being a first sergeant or sergeant major pulls these senior personnel away from the maintenance arena. This requirement negates their direct influence on maintenance operations and the day-to-day training of our junior mechanics. As a result, they have little or no impact on aircraft readiness.

The U.S. Air Force's Pave Hawk mechanics attend a 17-week general maintenance course at Sheppard Air Force Base, TX. This course is not aircraft specific, but instead provides students with a broad range of skills necessary for performing maintenance on any rotary wing aircraft.

Following this course, the U.S. Air Force assigns mechanics to either a Special Operations Squadron or Air Search and Rescue Squadron as a level-three mechanic. Unlike the Army, at level three an Air Force mechanic serves as an apprentice and is not authorized to work unsupervised on any aircraft. A level-three mechanic is usually an Airman or Airman First Class (AIC) (E-2, E-3).

At his unit, the level-three mechanic receives additional training to qualify him as a level-five mechanic. This training includes completion of training manuals in the career development course, and formal specified on-the-job-training (OJT). A written examination is the final qualifying step in level-five certification. A level-five mechanic is the 1st Assistant Crewchief, which normally equates to a rank of AIC or Senior Airman (E-3, E-4).

The final step in becoming a crewchief in the Air Force is to reach a level-seven mechanic rating. Although no formal training prerequisite is required, a level-seven mechanic must have 6 to 9 years of experience. A level-seven mechanic usually is a staff sergeant or technical sergeant (E-5, E-6).

Air Force crewchiefs normally are exempt from nonmaintenance duties. The Air Force Inspector General's Office closely monitors both the experience/grade of the crewchief and the time he spends on his aircraft. The Air Force philosophy is that the crewchief owns his aircraft; it is his weapon system, and no other duty takes precedence.

Unlike the Army, the Air Force maintains a dual track for NCO advancement that separates operational and technical promotion to the senior grades. Trained technicians can remain in the aircraft maintenance environment throughout their career (E-1 through E-9). This approach is currently under consideration for Army Aviation. The Air Force believes this system is essential to produce the maintenance experience needed for high operational readiness.

The Navy conducts a 6-week basic mechanics course at Memphis Naval Aviation Technical Training Center, Memphis, TN, followed by a 10-week Seahawk- specific organizational maintenance course at Mayport Naval Air Station (NAS), Jacksonville, FL. A separate intermediate maintenance course at Norfolk NAS, VA, is available for those personnel who will perform off-aircraft maintenance. After the Navy's mechanics report to the fleet, they receive OJT similar to that of the Army. No formal follow-on or advanced schools are available for their mechanics. However, many specialization courses are available that provide for skills enhancement. Navy technicians also remain in the maintenance field through the most senior grades.

Manpower Authorizations

The Army Assault Helicopter Battalion researched by USAALS includes two companies with 15 aircraft each. Each lift company has 18 authorized crewchiefs and supervisors. The battalion's AVUM platoon has 58 people, and the battalion's AVIM support slice includes 41 personnel. Combining the AVIM, AVUM, and crewchief support results in approximately 4.5 maintainers per aircraft.

Special Operations Aviation (SOA) circumstances are somewhat better. The Army's SOA Regiment has 84 crewchiefs and 140 AVUM/AVIM personnel supporting 30 Black Hawks (modified), which equates to 7.5 maintenance personnel per aircraft. Because of their immediate-response, high-profile mission, this

ratio is an aberration from the standard Aviation organization.

For 11 MH-60s, the Air Force assigns 120 personnel to perform crewchief/firstline maintenance, and 29 personnel at Direct Support level. This ratio equates to 13.5 maintenance personnel per aircraft.

A Navy SH-60B Seahawk Squadron has 13 aircraft assigned. In support of these aircraft each squadron has a maintenance department authorized 143 personnel or 11 maintainers per aircraft. Additionally, intermediate maintenance personnel rotate from sea to shore with the aircraft. The number of intermediate personnel per aircraft varies depending on the type of ship the SH-60 deploys on.

Readiness

Do the readiness rates bear out the value of properly manning the force? Average mission ready rates over a 3-month survey period are shown below. You be the judge.

	Maintainers per aircraft	Mission Ready Rate
Air Force (11 acft)	13.5	83.8%
Army SOA (30 acft)	7.5	81.2%
Navy (13 acft)	11.0	73.0%
Army AHB (30 acft)	4.5	52.9%

acft - aircraft
SOA - Special Operations Aviation
AHB - Assault Helicopter Battalion

Another major factor brought out during the USAALS fact gathering effort was the disparity in nonmaintenance work performed by maintenance people among the three services. Army maintainers average almost 70 percent of the work day at things other than MOS-related functions. Guard duty, company details, ground vehicle driver duties and maintenance, and other extraneous responsibilities often take precedence over aircraft repair work.

In comparison, Navy and Air Force maintenance personnel do not serve as drivers or vehicle mechanics, nor do they guard the flightline or ship. They usually are exempt from any additional duties that would hinder aircraft maintenance.

Further, the density of Air Force and Navy maintainers allows them to operate more than one maintenance shift. When a Pave Hawk lands after a long mission day, fresh maintenance crews are ready to perform whatever repairs or services are necessary to put it back into the air the next day. The aircraft's prime maintainer, the crewchief, coordinates closely with these crews to ensure nothing is overlooked.

The ability to work multiple shifts is a luxury the Army does not have. The upfront shortage of manning authorizations, compounded by the nonmaintenance distractors, results in maintainers/crew- chiefs consistently spending 12- to 16-hour workdays to keep readiness rates at a reasonable level. Army crewchiefs often work a normal 12-hour duty day and up to 14 or 16 hours when an aircraft is nonmission ready. The effectiveness, efficiency, and safety implications of that situation are obvious.

Many units ensure that the i's are dotted and t's crossed in crew rest policy for aviators, but the maintainers are not given that consideration. Additionally, Army crewchiefs often deploy to locations where work conditions are far less than ideal. Army maintainers often work from muddy or sandy field sites, at all weather extremes, and without the benefit of shelters or the ability to perform white light maintenance.

Army mechanics must constantly prepare for impending tactical moves. During these move, work is put on hold while maintainers serve on quartering parties, NBC reconnaissance teams, or assist in the actual move. In contrast, the Air Force and Navy deploy to fixed sites and work from either a hardstand or ship. Seldom will they cease maintenance operations to perform duties as tactical airmen or sailors.

The comparisons in training, manpower, and readiness clearly illustrate the wide disparity in maintenance resourcing and emphasis that exists between the U.S. Army and her sister services. The units evaluated in the USAALS study have different characteristics and missions, but the evidence remains irrefutable that there is a real correlation between the number of maintainers and man-hours made available for aircraft repair work and a unit's mission capable rates.

The Army must revise its traditional way of thinking on tail-to-tooth ratios. As vividly demonstrated in the desert, today's force relies more on the firepower of "high tech" weapon systems than line soldiers to destroy an enemy. We must acknowledge that high tech not only applies to materiel, it applies to the people who keep that materiel working.

The current Aviation Restructuring Initiative will go a long way toward beefing up our maintenance force. However, the Army also must place strong command emphasis on keeping the maintainers we do have on the flightline. That is the only way we can keep our Aviation readiness standards from lagging behind that needed to field an effective warfighting force. ❐

—*A SYSTEM DESCRIPTION*

UNIT LEVEL LOGISTICS SYSTEM - AVIATION (ULLS-A)

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Hey, it's almost the end of the 20th century! Why are you still doing your aviation forms and records with pen and pencil? This is the age of computers, CD ROM, laser printers, and Star Wars technology. Wake up and look around—the Unit Level Logistics System—Aviation is here!

The Project Managers (PMs) for ULLS-A are PM Integrated Logistics System (ILOGS) and his subordinate, PM ULLS. Through their efforts, the U.S. Army Combined Arms Support Command (CASCOM) and the U.S. Army Information Systems Software Development Center (ISSDL), Fort Lee, VA, along with numerous major Army commands, over a 3-year period, made ULLS-A a reality. On 18 March 1993, ULLS-A passed its Software Acceptance Test (SAT) at the 3-227th Aviation (Avn) Battalion (Bn), 4th Avn Brigade (Bde), 1st Armored Division (Div), Hanau, Germany.

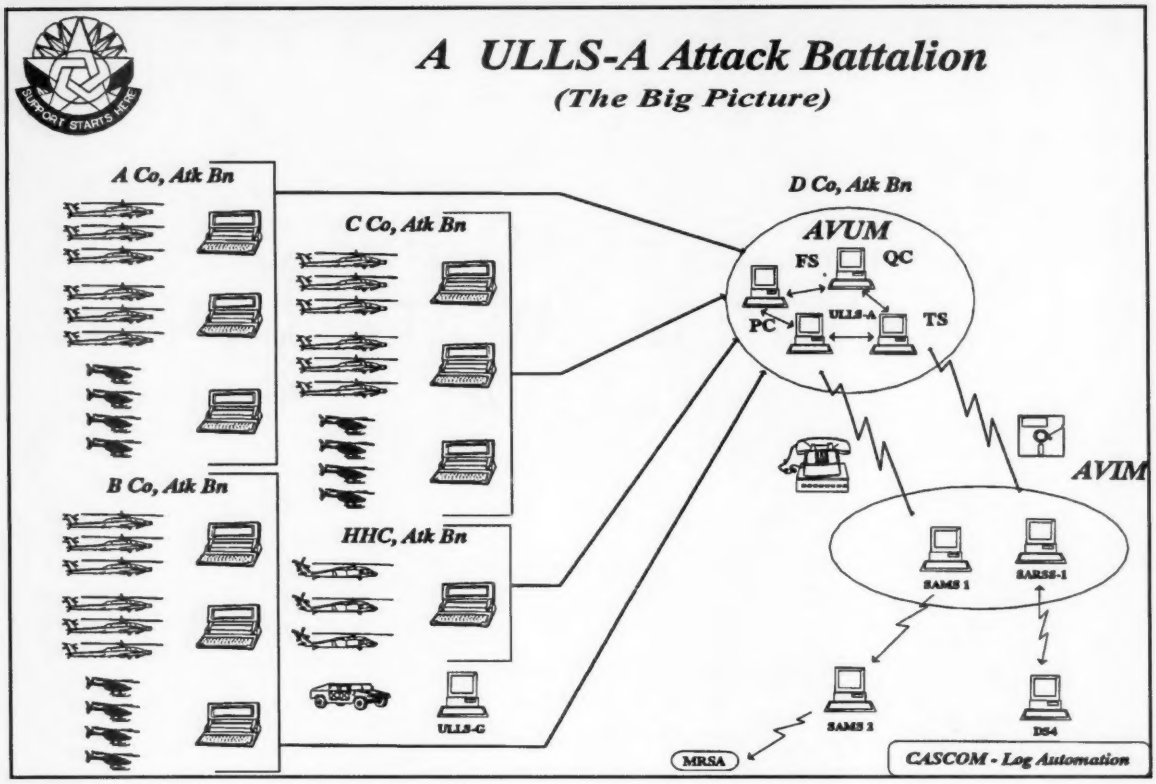
Overview of ULLS-A

ULLS-A is a "Go-to-War," combat service support (CSS) system with peacetime application. It automates The Army Maintenance Management System (TAMMS-A), supply (Class IX), and aircraft readiness reporting (Army Material Status System (AMSS)). It provides supervisory control, flexibility and speed in maintenance operations, expeditious and accurate reporting of repair parts, and communications with the Standard Army Retail Supply System - Interim/Objective (SARSS-I/O) and the Standard Army Maintenance System (SAMS). The system will eliminate errors that commonly occur in the manual maintenance and supply processes.

ULLS-A is an automated, menu-driven, personal computer network system that operates within an aviation battalion/squadron. The network consists of stand-alone, laptop computer systems located at each flight company/troop. Flight companies/troops will operate with one or more laptop computer systems with three to five aircraft files present on each system.

The aviation unit maintenance (AVUM) company/troop within the battalion/squadron and aviation intermediate maintenance (AVIM) company will operate with four desktop computers on a local area network (LAN). The LAN is organized to serve production control (PC), quality control (QC), and tech supply (TS). A dedicated file server, the fourth computer located in PC, is used as the central system to store and process records and data.

For the entire network to function properly, QC must initially build a current and accurate DA Form 2408-4, -5, -15, -16, -17, and -19 data base for each aircraft. The data base must reside on both the LAN and flight company



laptop computers. The network is updated by using the data transfer process by modem, the preferred method, or diskette.

The flight company initiates the data transfer cycle to the LAN PC workstation by modem or diskette. Flight company data update the LAN. Once the LAN is updated by data transfer, the data base for the battalion fleet will reside on the file server. The data transfer cycle concludes with the LAN processing the data and sending data log files (status) back to each flight company's stand alone system by modem or diskette.

The AVIM PC initiates AVIM maintenance support for an aircraft or component through the support-level maintenance request process. The request for support is made on a floppy diskette and forwarded to SAMS. The AVIM PC then sends daily SAMS status by diskette to the AVUM to update the LAN.

When an aircraft is workordered to the AVIM, the aircraft's records must be temporarily transferred out of the AVIM PC by diskette. This is done so the AVIM has access to update the aircraft's records. When the AVIM receives the aircraft and data diskette, the AVIM PC transfers the aircraft data into the LAN (AVIM). Once work is complete, the transfer process is reversed. Movement of Class IX supply data between the source of supply (AVIM) and the tech supply (AVUM) remains the same as currently used with ULLS-Ground.

ULLS-A Processes

ULLS-A is divided into five major processes: Class IX Supply; System Utilities; Maintenance (Operational—flight company, Production—PC, and Historical—QC); Materiel Status (AMSS); and Tutorial. Processes are menu-driven with on-line help. The five processes are defined as follows:

Class IX Supply.

a. Class IX Supply processes allow the user to—

- Order parts.
- Replenish supplies (prescribed load list (PLL) and bench stock).
- Post all supply actions automatically.
- Perform PLL maintenance and document control register actions.
- Add, change, update, analyze, and use data on the PLL.
- Perform demand analysis and catalog management.

b. A bench stock process and objective supply capability (OSC) have been added to the supply process. The bench stock process, unique to

aviation, manages low-dollar-value items used by the aviation shops. The other new addition, OSC, processes requests for parts through a gateway located in St. Louis, MO.

c. The user will also have these lists, reports, or options available to support supply management:

• Quick Supply Store (QSS) List—lists QSS items required.

• Commander's Exception Report—shows high-dollar items/high-priority requests requiring approval.

• Request for Cancellation—provides cancellation processing for request.

• Request for Followup—allows followup on requests.

• Request for Modification—provides for modification of request.

• Request for Turn-in—provides for turn-in of repair parts and manages excess.

d. The Class IX catalog management process provides on-line catalog data editing, queries, and a cross-reference of old and new items. Flight companies/troops will have the capability to demand parts and receive status from tech supply using their assigned computer.

System Utilities. The utilities process will assist the operator and system administrator to perform the basic functions of system and unit parameter set up.

a. This process—

• Establishes a unit's unit identification code (UIC) within the ULLS-A system.

• Configures supply, maintenance, and operational processes for automatic constraints and responses.

• Performs file maintenance by tape or diskette.

• Transfers aircraft into or out of the system.

• Provides archive management of 6-month historical files.

b. Another major utility process is system security. This process controls user access to ULLS-A data by assigning user and group access rights to each ULLS-A process. This limits users to processes required of that individual or group. For example, a crewchief can do all operational (flight line tasks) processes but cannot get into tech supply, historical, or production processes.

Maintenance Processes. These processes include—

a. Operational processes, which cover most tasks commonly associated with the flight crew and crewchiefs as follows:

• Aircraft Flight Log—allows entry of all data from DA Form 2408-12 and automatically posts information to personnel and maintenance records.

• Aircraft Fault Update—provides for management of aircraft fault records (ties into AMSS), Army Oil Analysis Program (AOAP) records, T700/701 history recordings, and recurring inspection update.

• Flight Pack—produces a current DA Form 2408-13-E/13-1-E (Flight Pack), -4-1-E, -14-E, -18-E, and Health Indicator Test (HIT) reference.

• Logbook Blank Forms—prints DA Forms 2408 -4-1-E, -12-E, -13-E, -13-1-E, and -14-E.

• Parts Demand—allows crewchiefs or maintenance techs to request parts from tech supply by modem, diskette, or printed copy and print a parts demanded list.

• Parts Installed—identifies a part received has been installed and the fault is no longer a waiting maintenance action.

b. Production processes, a group of automated functions that mainly concern the aircraft maintenance officer, production control section, and maintenance supervisors, which cover—

• Maintenance reports as follows:

a) Component Projection—identifies time change requirements for each aircraft based on projected flight and operating hours.

b) Inspection Projection—projects future inspections requirements for a given timeframe for each aircraft.

c) Oil Sample—shows information on oil samples taken and shipped, and oil sample results received.

d) Open Fault Detail—produces a report of open faults for any selected aircraft in the unit.

e) Closed Fault Detail—produces a report of closed faults for any selected aircraft in the unit.

f) Statistical Summary—provides a statistical summary of maintenance performed (aircraft mission hours, number of faults, and direct maintenance man-hours for a selected period of time).

g) Individual Maintenance Man-Hours—produces an individual report of direct maintenance man-hours for a selected time period and soldier.

h) Phase Flow Chart—produces a phase flow chart for each unit (battalion/squadron and company/troop) aircraft by model.

i) Aircraft Status—produces an aircraft status report by UIC (battalion/squadron and company/troop).

j) Commander Status—prints a report that provides the commander with an overall summary of aircraft status by battalion/squadron (model design series), company/troop (unit) and current aircraft summary.

k) PC/Backlog Status—provides a comprehensive report on work order status in the AVUM.

l) Engine Component Operating Hours—provides a unit consolidated DA Form 2408-19-3-E (for reporting to ATCOM).

• The remaining key parts of the production process are as follows:

a) Operations Report—compiles operational reports on ammunition usage and aircraft operations (flight hours, landing, passengers, loads, and fuel use) by UIC.

b) Master File Maintenance—allows PC to manage (add, modify, delete, and update) ATCOM's aircraft component, engine (T700/701), inspection, and inventory files.

c) Aircraft Data Transfer Process—includes the aircraft transfer process, which allows aircraft to be transferred in or out of the unit on either a temporary or permanent basis (work order to higher, task organizing internal or external to a unit, or property book transfers).

ULLS-A

Unit Level Logistics System Aviation

d) Data Transfer Process—moves data by disk or modem from the flight company to the AVUM LAN.

e) Maintenance Request—allows production control to initiate/record unit work requests for either inter shop AVUM or AVIM.

f) Manual Maintenance Status—allows production control to update status on AVUM maintenance requests and to consult current maintenance status from the AVIM.

g) Automated Maintenance Status—allows ULLS-A to accept, accumulate, and display support-level maintenance request/status information transmitted by diskette from the SAMS AVIM.

h) View/Print Maintenance Request Register—lists unit's AVUM and AVIM maintenance requests and shows the status of each request.

i) Fault Review—facilitates PC review and AMSS reporting of aircraft nonmission capable (NMC) faults entered by the flight company/troop for inclusion in the AMSS report.

j) Send SAMS Transaction—communicates inoperative equipment data and work orders to the AVIM by diskette from the AVUM.

c. Historial processes. These processes, a group of automated functions—generally the responsibility of the QC section—keep records of application of maintenance work orders (MWOs); safety of flight (SOF)/Safety of Use (SOU)/Aviation Safety Action messages; significant aircraft and component events; tracking of components, inventories, inspections, and engine and AOAP data. They include—

• Aircraft Modification Record (DA Form 2408-5-E)—a record of MWOs applied to an aircraft.

• Component Modification Record (DA Form 2408-5-1-E)—a record of SOF/SOU messages, Aviation Safety Action messages, technical bulletins, other one-time inspections, and MWOs on serialized reportable components and modules.

• Aircraft History Record (DA Form 2408-15-E)—a record containing information on significant aircraft life cycle events such as overhauls, phases, contamination, etc.

• Aircraft Inventory Record (DA Form 2408-17-E)—uses a standardized list by aircraft model design series (MDS) to manage inventory records of accountable property assigned to a particular aircraft.

• Aircraft Inspection Record (DA Form 2408-18-E)—a record of recurring inspections, services, checks, and replacements not part of the Progressive Phased Maintenance (PPM) program.

• Turbine Wheel History Record (DA Form 2408-19-E)—maintains a permanent record of historical data for aircraft engine turbine wheels.

• Aircraft Engine Turbine Engine Analysis Check (TEAC) Record (DA Form 2408-19-1-3 and -2-E)—a record of an aircraft's engine data from a TEAC.

• Oil Analysis Record (DA Form 2408-20-E)—a record of oil sampling and laboratory results.

• Aircraft Vibration Record (DA Form 2408-15-2-E)—used to record results of vibration checks.

• Aircraft Engine Health Indicator Test (HIT)—used to record HIT checks and create an engine HIT reference chart.

• Component Management Record (DA Form 2408-16-E, -1-E, and -2-E)—used to initialize and manage reportable aircraft component records at levels 1, 2, and 3 as well as controlled replacement management.

• Weapons Management Record—used to maintain records for each reportable weapon/subsystem installed on an aircraft. Through AMSS, ULLS-A provides an automated report (replaces DA Form 3266) on the status of each weapons system through SAMS and MRSA to the systems managing MACOM.

• Print/Reprint/Purge DA Form 2410 (DA Form 2410-E)—prepares, prints, and saves a copy of the DA Form 2410-E when a reportable component is removed from an aircraft.

• Initialize Aircraft—an automated process required to enter demographic information (aircraft model number, nomenclature, end-item code, National Stock Number, serial number, UIC, station, aircraft hours, starts, landings, etc. (about a unit's aircraft that will constitute the unit data base).

Materiel Status Processes. AMSS is the Army's new automated status reporting system. The U.S. Army Materiel Command, Materiel Readiness Support Activity (MRSA), Lexington, KY, developed this new system. Within ULLS-A, the system replaces DA Form 1352 (Army Aircraft Inventory, Status, and Flying Time Report) and DA Form 3266-1 (Army Missile Materiel Readiness Report). AMSS will accumulate nonmission capable (NMC) and partially mission capable (PMC) time for nonmission capable maintenance (NMCM), nonmission capable supply (NMCS), nonmission capable depot (NMCD), fully mission capable (FMC) and mission capable (MC) time as the old DA Form 1352 and DA Form 3266-1 status reports.

The AMSS report is completed in the time it takes to push three keys to run the

process instead of the long, arduous hours of compiling DA Form 1352 and DA Form 3266-1 from feeder reports. (All data must be properly input during the report period.)

After the AMSS files are compiled, they are electronically forwarded through SAMS-1, SAMS-2, and on to MRSA where the system managers access the information.

Tutorial Process. A superb tutorial, which replicates all of the ULLS-A processes, except AMSS, can be accessed from the main menu. This process will be key to a unit's sustainment training for this system.

ULLS-A NET

The ULLS-A New Equipment Training (NET) will be extended to aviation units in three phases: Initial contact with the unit, installation survey (pre-extension), and extension. Initial contact with a unit occurs 6 to 7 weeks before the installation survey and lasts 1 to 2 days.

Representatives from PM TACMIS (Tactical Management Information Systems) (chief of installation (COI)), the unit's MACOM, and CASCOM will establish points of contact with the unit (ideally with the brigade aviation maintenance officer (BAMO)), division/corps automation office, and force modernization representatives. During this contact units representatives are briefed on ULLS-A and the ground work is begun for the installation survey and follow-on extension of the ULLS-A system.

The installation survey is a 5-day training and coordination effort. It is conducted at the unit 120 days before a scheduled ULLS-A extension by representatives from PM TACMIS (COI), the unit's MACOM, and CASCOM. The visit is to orient new users to ULLS-A, develop training and computer run schedules, identify and schedule training facilities, train and start conversion of the unit's data, and acquaint the new users with their responsibilities in preparing for the extension. Key to this installation survey is CASCOM's mission to train at least two technical inspectors from each AVUM and AVIM QC section to initialize and convert aircraft historical, component, and inspection records from the old log books into the ULLS-A system. After completing the pre-extension activities, the installation survey team and the units involved will draft and sign a Memorandum of Agreement (MOA). The MOA will cover each signing agencies' responsibilities before, during, and after the ULLS-A extension.

The ULLS-A extension, a 7-week process, is designed to train 15 to 16 unit cadre personnel (by the CASCOM extension team) and most of an aviation brigade's aviation MOSs. The process will convert/monitor the first battalion automated with ULLS-A.

Training of ULLS-A during an extension will be conducted using the "Train the Trainer" concept. Under this concept, a unit's training cadre will receive 104 hours of instruction from the CASCOM extension team. This team of ULLS-A trained cadre will the train those units scheduled to receive ULLS-A. Key cadre members also will conduct the actual conversion processes for each battalion/squadron. To assist the unit's cadre, the CASCOM extension team will remain on site 1 more week to assist/monitor cadre training, trouble shooting, and conversion of the second battalion to ULLS-A.

The data conversion process of the extension uses unit cadre trained under the Train the Trainer concept to take a unit through conversion. The conversion process takes at least 1 week if the unit's data are complete and accurate. To assist with the conversion, the CASCOM extension team provides software programs that will convert existing ULLS (ULLS-Ground Supply) supply data; extract supply catalog from Direct Support Unit Standard Supply System (DS4) or SARSS-O/I; and check unit aircraft historical, component, and inspection data for completeness and accuracy.

MOS Training

ULLS-A, directly or indirectly, affects every aviation MOS in an aviation unit. You may be a flight line crewchief inputting data or a battalion or brigade commander using the system's vast array of status and maintenance reports to make management decisions. If so, ULLS-A will impact on your job. To ensure all personnel are ready for their unit to be automated, training has been specifically designed for the MOSs and grades listed on the table on the following page.

ULLS-A Hardware

ULLS-A is designed to operate using a personal computer with keyboard, monitor, printer, and tape drive. The operating system software is Microsoft Disk Operating System (MS-DOS), and the application is written in Ada. A brief description of the flight company/troop and AVUM/AVIM hardware systems follows:

a. Flight Co/Troop—386 or higher laptop computer, 120M hard drive, 3.5 disk drive, 4M RAM, internal modem; 120M Tape backup system; and an ALQ wide carriage printer. The fielding ratio is about 1 laptop for 3 aircraft and 15 percent overage for floats.

b. AVUM/AVIM—386 or higher desktop computer, 130M hard drive, 3.5 disk drive, 5.25 floppy drive, 8M RAM, 80M tape backup drive; Multi Tech 224 modem; ALQ wide carriage printer; and two sets of LAN wiring (garrison and field). The fielding ratio is 4 desktops, 3 printers, and 3 modems per LAN per AVUM/AVIM and 15 percent overage for floats.

PM ULLS will provide transportation cases for all the ULLS-A hardware except the laptop, which comes with its own carrying case.

Maintenance for the hardware will be covered initially under a 2-year dealer warranty with a follow-on, 3-

MOS	GRADE	TRAINING	LENGTH OFTRAINING
15A/B	04-06	ULLS-A Executive Briefing	2 hours
15A/B	01-04	ULLS-A Mid Level Management Training	1 day
BAMO/Maint Off		ULLS-A Mid Level Management Training	1 day
15D/BAMO/Maint Off	01-03	ULLS-A PC/QC Training	8 days/8 hrs/day
151	W1-W5	ULLS-A PC/QC Training	8 days/8 hrs/day
152-156	W1-W5	ULLS-A System Overview (Pilots)	2 hours
67 Series	E1-E7	ULLS-A Crewchief Training	3 days/8 hrs/day
67/68 Series	TIs	ULLS-A PC/QC Training	8 days/8 hrs/day
68 Series	E6-E7	ULLS-A Crewchief Training	3 days/8 hrs/day
76C	E1-E5	ULLS-A Supply Training	3 days
74F	E1-E7	System Support Training	5 days/8 hrs/day
151-156	W1-W5	System Administrator Training	5 days/8 hrs/day

year maintenance contract established by PM TACMIS. Downtime on any ULLS-A hardware should be relatively transparent to the user through the use of float hardware. Daily backup of data at the flight company/troop or LAN will allow easy movement of data to a float computer system should a unit experience a hardware failure.

Benefits and Impacts of ULLS-A

ULLS-A is an extremely powerful software maintenance management tool with benefits from using the system and impacts from fielding the system. Four key benefits of the system are—

a. Increased productivity of crewchiefs, technical inspectors, and production control personnel.

b. Standardization of the automated (TAMMS-A) in every aviation unit.

c. Increased accuracy in TAMMS-A forms maintenance, ordering of parts, fault review, and aircraft status reporting.

d. A large saving in dollars and manhours through increased accuracy in ordering parts and productivity.

The benefits of ULLS-A naturally outweigh any side effects of getting the new system. However, no new system is fielded without some problems from NET and initial startup. ULLS-A is no exception. Some of the impacts units can expect to experience during an ULLS-A fielding are—

a. Units will have to detail 15 to 16 of their best soldiers temporarily as ULLS-A cadre for 8 to 10 weeks.

b. Soldiers attending ULLS-A training will not be available to maintain aircraft.

c. AVUM/AVIM technical inspectors will spend a vast number of manhours for 120 days loading historical data for the unit's aircraft before the extension.

d. Increased accuracy in operational readiness (OR) rate reporting may lower a unit's OR rate initially.

e. Units will experience a variable learning curve, meaning ULLS-A is a crawl, walk, run system.

f. Units will pick up an added mission to sustain the training of ULLS-A.

Fielding Schedule

The only unit fielded to date is 4th Avn Bde, 1st Armored Div, Hanau, Germany. Follow-on fielding depends on the U.S. Army Operational Evaluation Command's (OEC's), Alexandria, VA, Abbreviated Operational Assessment (AOA) Report on the ULLS-A SAT. The SAT was conducted at 3-227th Avn Bn, 4th Avn Bde, 1st Armored Div, Hanau, Germany, 16 February to 15 March 1993. The report is due out early May 1993. A favorable AOA report by OEC will allow limited fielding to XVIII Airborne Corps, 82d Airborne Div, Fort Bragg, NC; 101st Air Assault Div, Fort Campbell, KY; 1st Cavalry Div, Fort Hood, TX, 24th Infantry Div, Fort Stewart, GA; and the 3d Armored Cavalry Regiment, Fort Bliss, TX.

A Milestone III approval is expected in the 4th quarter fiscal year 1994, after a March 1994 Initial Operational Test to be held at Fort Hood, TX. This Milestone III approval will authorize full fielding of the ULLS-A system to the rest of Army Aviation, Active and Reserve Components.

An In Process Review (IPR) on ULLS by the Major Automated Information Systems Review Council (MAISRC) is expected to be scheduled in the May-June 1993 timeframe. The MAISRC will review the ULLS (Aviation, Ground, and S4) Test and Evaluation Master Plan and Economic Analysis.

This review will cover the ULLS testing strategy and life cycle system costs. During this IPR, PM ULLS will request authority to procure hardware for both Fort Rucker, AL, and Fort Eustis, VA, aviation and maintenance schools.

Information Sources

For more information, call DSN 687-0721, or write Commander, USA-COSCOM and Fort Lee, ATTN: ATCL-SSB. Fort Lee, VA, 23801-5000 ❐

—*A SOLDIER'S PERSPECTIVE*

UNIT LEVEL LOGISTICS SYSTEM - AVIATION (ULLS-A)

CW4 James L. Jernigan
Senior Instructor, Maintenance Operations
Maintenance Management Division
U.S. Army Aviation Logistics School
Fort Eustis, VA

It had been a long day...several hours of flying, 2 hours of maintenance, completion of oil samples, and a preventive maintenance daily. I headed for the crewchief shack to update my computer and print a new flight pack for tomorrow's flight. Is this something new?

You bet it is. U.S. Army Aviation maintenance has finally reached the age of automation. The new maintenance and management tool is the Unit Level Logistics System - Aviation (ULLS-A). This system provides managers and commanders with capabilities they could have only dreamed of before.

The ULLS-A is a complete automation system. It includes hardware, communication, executive and system support software, and software applications that automate and integrate The Army Maintenance Management System - Aviation (TAMMS-A), technical supply, and materiel status reporting.

For the first time, ULLS-A incorporates technical supply operations, aircraft fault data, aircraft historical records, scheduled inspections, work order files, and materiel status reports into a fully integrated operation.

The origin of ULLS-A can be traced back to a U.S. Army Aviation and Troop Command (ATCOM) requirement to develop an automated logbook system for Army aircraft. The Logbook Automation System (LAS) was developed under an ATCOM contract with the Cobro Corporation.

In October 1988, the contractor delivered LAS to the U.S. Army Combined Arms Support Command (CASCOM), Fort Lee, VA. Included was a functional description for development of LAS into a Standard Army Maintenance Information System (STAMIS) within the framework of ULLS. The LAS currently is being used in selected National Guard and Active Army units.

The Program Manager ULLS (PM ULLS), through CASCOM and the U.S. Army Information System Software Development Center Lee (ISSDCL), designed and developed ULLS-A. PM ULLS integrated the TAMMS-A features of LAS with the supply and maintenance features of ULLS and the Army Materiel Status System.

The ULLS-A automates and dramatically improves supply and maintenance functions at the unit level. Through automation, the ULLS-A provides greater supervisory control and flexibility to maintenance operations.

The ULLS-A expedites repair parts supply and maintenance

CW4 Jernigan served as Chief of the MACOM Evaluation Team, ULLS-A Software Qualification and Acceptance Tests.

ULLS-A MENU OF OPTIONS

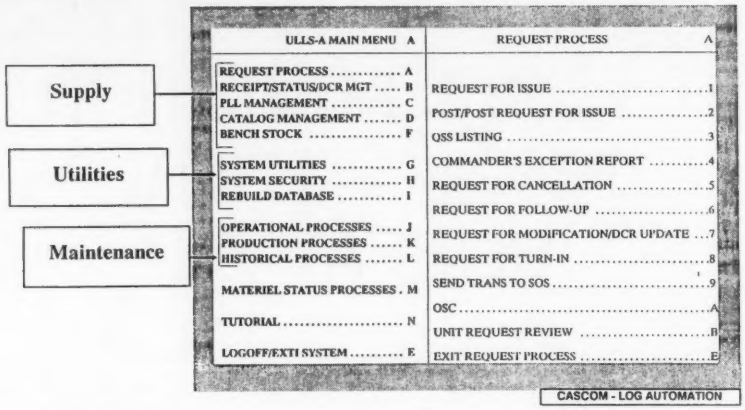

Supply
Utilities
Maintenance
ULLS-A MAIN MENU A
REQUEST PROCESS ..... A
RECEIPT/STATUS/DCR MGT ..... B
PLL MANAGEMENT C
CATALOG MANAGEMENT ..... D
BENCH STOCK ..... F
SYSTEM UTILITIES ..... G
SYSTEM SECURITY ..... H
REBUILD DATABASE I
OPERATIONAL PROCESSES ..... J
PRODUCTION PROCESSES ..... K
HISTORICAL PROCESSES L
MATERIEL STATUS PROCESSES . M
TUTORIAL ..... N
LOGOFF/EXTI SYSTEM ..... E
REQUEST PROCESS A
REQUEST FOR ISSUE 1
POST/POST REQUEST FOR ISSUE 2
QSS LISTING 3
COMMANDER'S EXCEPTION REPORT 4
REQUEST FOR CANCELLATION 5
REQUEST FOR FOLLOW-UP 6
REQUEST FOR MODIFICATION/DCR UPDATE ... 7
REQUEST FOR TURN-IN 8
SEND TRANS TO SOS 9
OSC ..... A
UNIT REQUEST REVIEW ..... B
EXIT REQUEST PROCESS ..... E
CASCOM - LOG AUTOMATION

Figure 1

records-keeping and management functions at the lowest level.

Many of the jobs in the unit are performed by ULLS-A with minimum input from the user. For example, when the user orders a repair part, ULLS-A edits the request, updates the Document Control Register, records the demand, and provides information to update nonmission capable (NMC) equipment data.

Automation of supply procedures is a great help to aviation units; however, automation of maintenance operations, materiel status reporting, and TAMMS-A forms and records is the greatest benefit to the aviation unit.

The system maintains and processes supply and maintenance functions in an interactive manner. This interaction provides maintenance supervisors and commanders with up-to-date and accurate information almost instantly.

The ULLS-A has a maintenance workload projections capability to match any operational contingency.

These are just a few of the features of the reporting and planning capabilities and advantages that ULLS-A gives the commander.

Other capabilities include status reports, phase flow charts, man-hour reports, statistical summaries, aircraft fault reports, maintenance backlog summaries, aircraft status reports, and commander's reports.

With these management tools readily available, commanders and maintenance personnel can be better informed and can more accurately make the right decisions on maintenance and supply matters.

With the capabilities of ULLS-A to project scheduled inspections and time between overhaul (TBO) component replacements, commanders and maintenance supervisors can forecast aircraft availability and budgetary requirements with much greater accuracy.

Training is a key element in a successful unit conversion to ULLS-A.

The system is menu-driven and user-friendly. It is also enormous in scope and requires experienced, well-trained operators. Users—crew-chiefs, mid-level managers, and commanders—must receive the proper training to use ULLS-A efficiently and effectively, and to take full advantage of its capabilities. An embedded tutorial is provided for reenforcement training within the unit.

The U.S. Army Aviation Logistics School (USAALS), Fort Eustis, VA, will integrate ULLS-A into various courses.

They are career management field (CMF) 67 advanced individual training (AIT), basic and advanced noncommissioned officer courses (BNCOC and ANCOC), military occupational specialty (MOS) 151A Aircraft Maintenance Technician, and maintenance manager/maintenance test pilot (MM/MTP) courses.

This training will begin in the first quarter of fiscal year (FY) 1995 (October 94).

The functions in ULLS-A consist of 13 processes divided into five major areas: Class IX supply, system utilities, operations processes, maintenance and historical processes, and materiel status processes.

Figure 1 shows the main menu screen displaying the functions.

The ULLS-A was developed for use on International Business Machine-compatible micro-computers with a keyboard, monitor, and tape backup system. The operating sys-

tem software is the Microsoft Disk Operating System (MS-DOS).

The hardware provided includes a four-system local area network (LAN) at the aviation unit maintenance (AVUM) company with work stations for use in the technical supply section, the quality control section, and the production control office.

The fourth terminal is not a work station. It functions as a dedicated file server and contains the consolidated ULLS-A data base.

Each flight company is provided laptop portable computers issued on the basis of one system for every three to five aircraft, depending on the type and mix of aircraft within the unit.

The flight company uses the systems to maintain its aircraft flight and logbook, print flight packs, initiate and correct aircraft and subsystem faults, create demands for repair parts, and maintain aircraft flight time and crew data.

The ULLS-A operates in a centralized data base environment. On the LAN at the maintenance company, a single data base serves three work stations and provides "real time" data to the user. The flight company systems are kept synchronized and current with the LAN by a data transfer process that uses one of two methods. The primary and preferred method is by modem. The secondary and backup method is by diskette.

Data transfer between the flight company systems and the LAN should occur at least once daily. Some operational contingencies may require data transfer more often. The data flow is in two directions, to and from the flight company systems.

Data generated at the LAN such as work order status, parts requests, parts statuses, component historical record updates, and aircraft inventory records flow to the flight company systems.

Aircraft fault records, flight time, and servicing data, and flight crew data are transferred from the flight company to the LAN. The Standard Army Retail Supply System (SARSS) and the Standard Army Maintenance System - Level 1 (SAMS-1) interface with ULLS-A by transaction diskette.

This interface reduces the time and error rate of supply and maintenance transactions. These diskettes contain supply transactions, maintenance requests, work order status information, and equipment inoperative data processed by SAMS-1 and SARSS.

Figure 2 shows a typical distribution of hardware within an aviation attack battalion and the interface relationship with other STAMIS.

The Logistics Automation System Support Office (LASSO) at the division or corps provides maintenance for the ULLS-A hardware and software. A system administrator is trained to provide system support within the unit.

To prevent loss of data from hardware or software failures, ULLS-

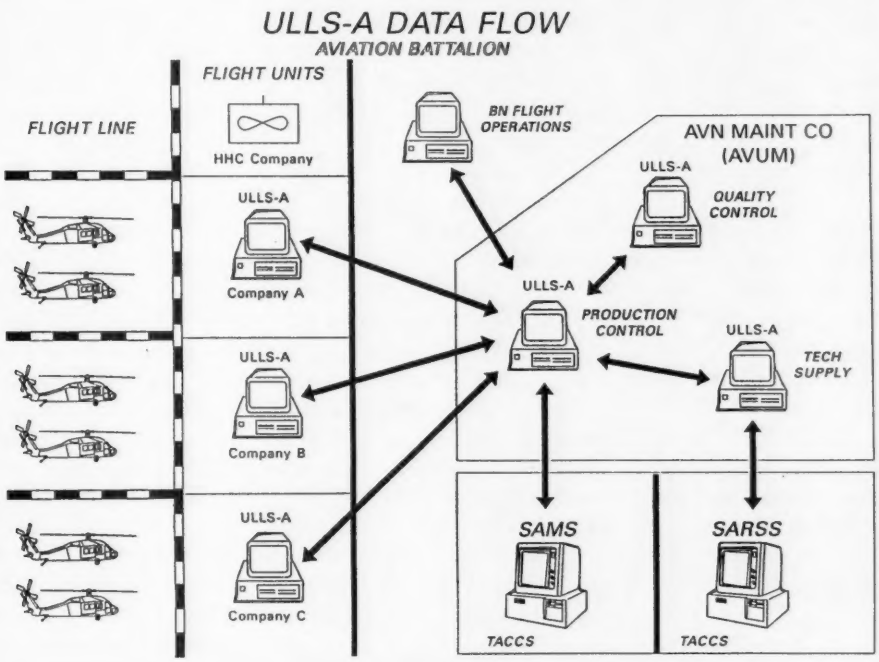


Figure 2

A is supplied with a 120-megabyte tape backup system for the flight company systems and an 80-megabyte backup system at the LAN. Tape backups are made at least once daily at each flight company system and at the LAN.

One of the most powerful and beneficial features of ULLS-A is the Army Materiel Status System (AMSS). Department of Defense Instruction 3110.5 (Materiel Condition Reporting for Mission Essential Systems and Equipment) directed implementation of AMSS.

When fielded, AMSS will be the single automated materiel status reporting system of record in the Army. Army Regulation 700-138 (Army Logistics Readiness and Sustainability) governs the AMSS, which provides feeder information to the Unit Status Report (USR) under AR 220-1 (Unit Status Report).

The AMSS was developed concurrently with, and fully integrated into, the ULLS-A software baseline. The AMSS is memory resident in all ULLS-A processes that affect the mission capable (MC) status of the aircraft and aircraft subsystems.

It was developed to provide units with an automated means of transmitting equipment status data to the Materiel Readiness Support Activity (MRSA).

Units that have been fielded with ULLS-A and report under AMSS no longer are required to report by using DA Form 1352 (Army Aircraft, Inventory, Status, and Flying Time) or DA Form 3266-1 (Army Missile Materiel Readiness Report).

A draft of AR 700-138, which will be released in July 1993, defines the requirements for reporting under AMSS. Maintenance Master Data Files (MMDFs) are provided from MRSA as part of the ULLS-A software baseline.

The MMDFs list all reportable subsystems—such as missile, armament, and communications—that are considered an integral part of the aircraft in performing its mission and give AMSS the capability to accurately report the statuses of the subsystems.

The AMSS receives equipment status input from the DA Form 2408-13 fault process, the work order process, and from the DCR process.

When an NMC condition occurs in any of these processes, AMSS reads and reports the data according to the guidance outlined in AR 700-138. For example, when an aircraft grounding condition exists and the fault has been entered on DA Form 2408-13-1E, AMSS reports the aircraft NMC until the condition has been corrected.

When an NMC condition exists on a reportable subsystem and a fault has been entered, that subsystem is reported NMC.

The aircraft is reported as partial mission capable (PMC) until the subsystem condition has been corrected. When high priority (02) parts are ordered for an aircraft fault or subsystem fault, and the aircraft or subsystem repairs are at a work stoppage, the AMSS reports the aircraft as NMCS or PMCS, whichever is appropriate.

Commanders can monitor the daily and accumulated statuses of assigned equipment through several reports generated by AMSS. At any time during the report period, projection reports allow the commander to project equipment materiel statuses for the end on the report.

This capability gives commanders, managers, and logistics personnel at all levels the opportunity to review and react to AMSS data before reporting to the national level.

The ULLS-A has the capability to allow the user to generate specialized reports for special or unique unit requirements.

Sage Data Base Inquiry (SDI) is a data base query system that enables the user to create, save, modify, and edit reports without the help of a programmer or extensive knowledge of the data base structure. Once the user has created a report, it can be displayed on the screen, printed on hard copy, or copied to a diskette.

The ULLS-A successfully completed a Software Acceptance Test (SAT) in March 1993 in the 3-227th Attack Battalion, 4th Aviation Brigade, 1st Armored Division, Hanau, Germany. The remaining units in the brigade were converted to ULLS-A at the conclusion of the test.

The 4th Brigade is the first unit in the U.S. Army to use ULLS-A. Based on the SAT results, an in process review board will convene in May 1993 to recommend limited fielding of ULLS-A to 18th Airborne Corp units at Fort Bragg, NC, and Fort Campbell, KY, and the 1st Cavalry Division at Fort Hood, TX.

The PM ULLS will develop a strategy for armywide fielding after successful completion of an operational test (OT) and a milestone III decision, currently scheduled for the fourth quarter of FY 1994. Hardware for ULLS-A will be centrally procured and fielded to each unit with a complete training package.

The ULLS-A is intended to become the commander's and maintenance supervisor's link in managing and monitoring the repair parts supply and maintenance status of the unit. The ULLS-A has the capability to integrate and provide accessibility to "real time" materiel condition and status data on a daily basis.

It provides the commander with management and reporting tools to assist in achieving one of his most important goals, assessing the unit's combat capability. The ULLS-A does it much quicker and far more accurately than it has ever been done before. The potential for savings and improving warfighting capability is tremendous.

Apache A6 Training Device

Serving the Army Again

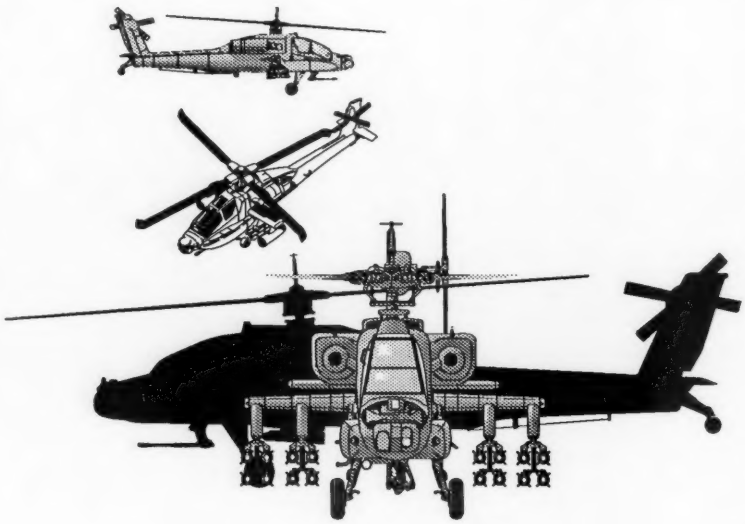
MW4 Graham Stevens
Chief, Advanced Attack Helicopter Division

and

CW4 Richard Smith
Deputy Chief, Advanced Attack Helicopter Division
Department of Attack Helicopter Training
U. S. Army Aviation Logistics School
Fort Eustis, VA

The AH-64 Apache shuddered when its tail rotor hit the tall tree. The helicopter began a spin to the right despite the pilot's efforts to regain control. Within seconds the tailboom struck an obstacle, and the aircraft's main rotor blades made contact with the ground. The once magnificent attack helicopter came to rest on its side, essentially broken in half. The severely damaged Apache appeared to be a candidate for a property disposal salvage yard.

Innovative thinking turned this crash-damaged airframe into a maintenance training asset. On 25 March 1993, the airframe was delivered as a maintenance training device to the Advanced Attack Helicopter Division, also known as the Apache Training Facility, Fort Eustis, VA. The aircraft is now known as Article No. 1, Airframe/Engine and Drive System Trainer (AEDST)-A6. A team effort by the Army and selected industry contractors has reconstructed this crash-damaged aircraft so that it can serve the Army again.



The AEDST-A6 program is the result of a combination of Army needs. The Army must return Apache aircraft (category Bs), which are presently being used as maintenance training airframes, to the operational or flying fleet. A continuous requirement also exits to have aircraft or devices for the training of maintenance students at Fort Eustis. Category Bs, with some specialized computerized training devices (A1, A2, A4, and A5), were the media for "hands on" maintenance until now.

The Apache Program Manager's (PM's) office, Program Executive Office, Aviation (PEO-AVN), St. Louis, MO, conceived the AEDST-A6 project, using crash-damaged aircraft (CDA) to create a new suite of training devices. This innovative project allows crash-damaged aircraft to be converted into realistic trainers and provide the Army with considerable savings. This, in turn, allows the return of category B training aircraft to their warfighting duties with the field commander. Based on historical experience, the Apache PM knew that each year some Apaches would be structurally damaged beyond cost-effective repair. Therefore, as CDAs became available, they would provide the means to create new trainers.

Once the concept was chosen, then came the hard part of turning the CDAs into a usable trainer at minimum cost. Based on their previous experience at modifying aircraft for the Army, Serv-Air, Inc., Bluegrass Army Depot, Richmond, KY, was awarded the prime contract to repair six airframes to the AEDST-A6 trainer configuration.

Apache PM began the process by delivering available CDAs and available nonflightworthy parts to Serv-Air. All salvageable parts and materials were removed from the CDAs. The remaining flightworthy or repairable parts were returned to normal Army supply and repair channels. The remaining parts were placed in storage in a special warehouse until needed for installation on future trainers. After the airframe was stripped, the structural repair process made the trainer structurally sound and aircraft-like in appearance again. The airframe was painted and "repopulated" with parts as called for in the trainer engineering drawings.

McDonnell Douglas Training Systems (MDTS), Mesa, AZ, was selected as the program integrator to incorporate the needs of the U.S. Army Aviation Logistics School (USAALS) and provide Serv-Air, Inc., an interface with the engineering department of the helicopter manufacturer, McDonnell

Douglas. Army subject matter experts in the 67R military occupational speciality (MOS) (AH-64 aircraft repairer) related courses met in working groups with MDTS training experts to create a total task inventory list (TTIL), which defined all tasks that must be trainable on the AEDST-A6. Also, these working groups defined the functional and physical fidelity (look and feel) that trainer components must meet. MDTS, as systems integrator, provided this information to the McDonnell Douglas engineering department so that trainer engineering drawings could be made and provided to Serv-Air.

Upon completion of Article No. 1, a Apache PM tasked a team of Army personnel to take part in a verification and validation process at Serv-Air's facility. The team was composed of Apache Training Facility instructors, who supervised the required task performances by advanced individual training graduates. The team validated TTIL as totally performable on the device and recommended further trainer enhancements that would improve the total aircraft environment, thus increasing the realism associated with the trainer. Ensuring "the green suiter" was part of the process contributed immeasurably to the success of the program.

Article No. 2 AEDST-A6 was displayed at the Army Aviation Association of America's annual convention in Fort Worth, TX, March 31 through April 4, 1993 and later delivered to the Apache Training Facility, USAALS.

The Apache A6 is the first of the "A" series of aviation training devices where design was driven entirely by the systems approach to training process. Since the beginning, USAALS subject matter experts have been involved in the A6 program at the training division level. The success of the program largely is due to the close working relationships developed between the Army, the Apache PM's Office, and the contractors. As a result, the acquisition program for the A6 trainers is ahead of schedule and below budget.

The AEDST-A6 serves as an example of what the Army and industry can do when working together in a cooperative team concept. This program recycles expensive Army assets into a usable trainer that will enhance the USAALS's product—the aviation soldier—for the field commanders' fighting force.

Concurrent with the delivery of the A6 trainers, the project team is working toward completing the next generation trainer, the Armament and Electrical Trainer (AET)-A7 for use in the 68X-series MOS.

The development process of the A7 is following the A6's pattern. The AET-A7 will be electrically and hydraulically powered to allow functioning aircraft systems. The AET-A7 will incorporate a computerized console that allows the insertion of selected system faults for student training in troubleshooting procedures. An additional innovation will be a mobile power system that will replicate the appearance and most functions of the auxiliary ground power unit. Delivery of Article No. 1 AET-A7 is scheduled for July 1994.

In a period of reduced defense expenditures and diminishing assets, the future role of training devices cannot be overstated. The A6 trainer, and the "A" series trainers to follow, will ensure continuing excellence in the training of our maintenance and support personnel to maintain the most sophisticated helicopter weapon system ever fielded. ❐

Continued from page 44.

of its large size and weight (approximately 35 pounds). The AMIDS will be much more amenable for use in aircraft maintenance.

Just think of a device that the crewchief can pull out of the logbook holder for use in performing the daily inspection. Then, the pilot checks the aircraft records with it before flight. After the flight, the crew logs flight time and any discrepancies. Again, the crewchief uses the AMIDS to get the proper troubleshooting information on discrepancies noted and orders parts needed via the device (major functions of the AMIDS). The AMIDS also incorporates the prognostic capability to track time-between-overhaul time replacement components as hours are flown off the aircraft. So, they may be ordered in advance and be on hand when replacements come due.

After the forms are closed out at the end of the flying day, data are transferred (possibly by floppy disc) to production control and quality control offices to update aircraft status and records, to supply for requisitioning needed parts, and to flight operations to update flight records. All these capabilities from one small black box! The capability is doable, and USAALS is expediting the program.

The potential benefits of AMIDS to Aviation maintenance operations are significant and have drawn the interest of our sister services. The simple factors of standardization and simplicity are the system's strongest points. The functions of prognostics, diagnostics, maintenance planning, supply management, record keeping, and capabilities to meet other automation requirements of the future will make the AMIDS an invaluable tool for the maintainer and the unit commander. ❐

Three steps toward quality maintenance programs

A COMMANDER'S APPROACH TO AVIATION MAINTENANCE

Captain Scott S. Snow
Flight Detachment Commander
12th Aviation Brigade
Wiesbaden, Germany

Let's face it: Aviation unit commanders are overwhelmed by the complexity and the dynamics of the mission at hand.

To complicate matters further, priorities often change daily, making it difficult to stay focused on what is really important.

Of all the important issues, however, aircraft maintenance should always remain high on a unit's list of priorities. Without quality aviation maintenance, aircraft don't fly.

If aircraft don't fly, then aviators, crews, and teams are not properly trained. Without quality aviation maintenance, flying hour programs are difficult to meet, and often the mission is not completed. A safe, effective maintenance program is not easily established.

The **first step** a commander must take towards a quality maintenance program is *to ensure maintenance is one of his highest priorities.*

Simply stating that maintenance is a priority is not sufficient. As a commander, you must show subordinates you are serious and take the necessary steps to prove it.

Provide maintenance personnel the time they need to do the work required. In addition, reduce the number of distractors that interfere with the daily maintenance routine.

It is important you set high standards and enforce those standards. Establish incentives for quality work. Give certificates and awards that single out maintenance excellence.

A crewchief of the month program is a good way to demonstrate the importance of good maintenance.

The **second step** towards a quality maintenance operation is *education.*

Remember when a fledgling crewchief graduates from school, he possesses basic maintenance skills.

It is up to aviation leaders to ensure these skills are broadened and refined. Establish a maintenance training program that is at least as important as the other areas in your unit training program.

Ensure your maintenance personnel have all the appropriate maintenance manuals as well as current changes. Remember always to insist on the proper use of those manuals.

As an aviation unit commander, you are automatically a maintenance officer. Accept this as fact, and educate yourself. Ensure you understand good maintenance practices.

Start your education by reading.

Publications that you should understand thoroughly include—

. Department of the Army (DA) Pamphlet (Pam) 738-751, *Functional User's Manual for the Army Maintenance Management System*;

. Army Regulation (AR) 700-138, *Army Logistics Readiness and Sustainability*;

. Field Manual (FM) 1-500, *Army Aviation Maintenance*;

. Technical Manual (TM) 1-1500-328-23, *Aeronautical Equipment Maintenance Management Policies and Procedures.*

In addition, you should have at least a basic working knowledge of the manuals specific to the aircraft in your unit.

Know what a daily inspection entails and have a good understanding of inspection procedures and policies within the unit.

Understand the requirements for maintenance operational checks and maintenance test flights. You should have a basic idea of what each member of your maintenance team is supposed to do and ensure they are all doing their jobs properly.

Take the time to learn good maintenance practices. For example, do not defer all of your shop maintenance until phase. This practice only results in a longer phase and takes a precious training asset out of your hands for the duration.

Use your crewchiefs as they were meant to be used. Remember, the crewchief mission is to coordinate all maintenance support for his assigned aircraft. Crewchiefs are the focal point around which all maintenance functions revolve.

If you have highly skilled, properly motivated crewchiefs in your unit, your maintenance posture will be a healthy one.

It is important to understand the supply system. Be aware of the type and number of items stocked in your unit's tech supply. Pay particular attention to those items difficult to requisition, or that have long order and ship times.

Good maintenance is no accident.

Make yourself aware of supply and maintenance trends, and you will be able to foresee and react to potential problems before they arise. Ensure components and repair parts are ordered well in advance of services and phases.

If the repair parts are on hand before the start of scheduled maintenance, down time will be significantly reduced.

The **third and final step** to establish a quality maintenance program is *to continuously monitor the program's progress.*

The most effective way to gauge the health of your maintenance program is to preflight a different aircraft periodically.

Look closely at the logbook. You are looking for one that is neat and well kept. Check to see deficiencies are being remedied in a timely manner.

If there are write-ups on the DA Form 2408-13, Aircraft Status Information Record, ensure they have current document numbers.

One clue to a potential problem area is to note who is making the bulk of entries on the -13. If pilots are making most of the write-ups, then it is possible the crewchief is not a doing a properly daily, or he is too inexperienced to identify potential deficiencies.

Preflight the aircraft closely and pay particular attention to its cleanliness. Dirt and grime seriously affect quality maintenance.

A dirty aircraft hides problems, and ultimately results in premature component failure or shortened service life. If an aircraft is not kept clean, you can count on expensive component replacements and failures in the near future.

If a crewchief simply devotes time keeping the aircraft clean, he or she will find problems before they become serious.

Remember, an aircraft that looks well-maintained probably *is* well-maintained.

Quality aviation maintenance programs are not difficult to establish or maintain. Commanders must understand mission success depends heavily on a good maintenance program. Therefore, quality maintenance has to be high on the unit's list of priorities.

Commanders must never leave the business of daily maintenance to someone else. It is important to get directly involved and *to stay involved*!

In addition, commanders have to ensure that maintenance personnel get all of the time and the resources required to get the job done properly. Success depends heavily on quality maintenance.

Good maintenance is no accident. When good maintenance is practiced, however, it is the single most important factor of a commander's success.

With quality maintenance, the mission will be accomplished safely and efficiently every time.

From "Dirt Bag" to "Most Responsible and Dedicated"

The Image Changes for Future Class III/V Platoon Leaders

First Lieutenant James F. Yacone
Aviation Officers Advanced Class 91-3
U.S. Army Aviation Center
Fort Rucker, AL

The last thing an incoming aviation lieutenant wants to hear from his new battalion commander is, "Congratulations, son, you're my new class III/V platoon leader!"

This article should help dispel the negative reputation of the class III/V platoon leader assignment and provide a few helpful suggestions for officers assuming the duty in the future.

After taking charge of the class III/V platoon, a lieutenant should concentrate on three suggesions—

. *Establish a strong working relationship with the platoon sergeant. The platoon sergeant, more than any other individual, can help make your tenure as platoon leader a success.*

. *Conduct a thorough initial property inventory. Learn how to properly account for your equipment or risk the possibility of paying for it!*

. *Become technically and tactically proficient in the job. Future class III/V platoon leaders' becoming tactically and technically proficient with the equipment they own and the mission they perform is critical.*

Information in this article is not all inclusive and by no means represents a "cook book" solution to becoming a successful class III/V platoon leader. Instead, the objective is to offer guidance to future class III/V platoon leaders before they assume one of the toughest and most rewarding jobs in an attack helicopter battalion.

The class III/V platoon leader has one of the most critical jobs in the attack battalion. The success or failure of the entire battalion hinges on the ability of the class III/V platoon to efficiently and safely arm and refuel the battalion's aircraft.

The unit can only continue to kill the enemy as fast as the forward arming and refueling points (FARPs) can refill and rearm the helicopters.

The mission of logistically sustaining the battalion with fuel and ammunition is obviously not as glamorous as the mission of the attack platoon leader. However, such fuel and ammunition sustainment is far more important to the overall success or failure of the attack battalion.

What three suggestions will ease the transition for new class III/V platoon leaders?

According to the table of organization and equipment, the class III/V platoon leader is responsible for almost as many soldiers and assorted amounts of equipment as the attack company commander. During field exercises, the class III/V platoon leader may have operational control of 45 to 50 soldiers and operate as many as three different locations simultaneously.

The responsibility of leading and training these soldiers to execute the exhausting mission of the class III/V platoon represents a leadership challenge for any officer.

A competent and confident platoon sergeant can definitely make the platoon leader's job a lot easier. Establishing a strong working relationship with the platoon sergeant is probably the most important thing to be done after taking charge of the class III/V platoon. He, more than anyone, has the most influence over your success or failure as a platoon leader.

The class III/V platoon sergeant is a technical advisor and valuable source of information. However, his primary function is to train and discipline the soldiers and execute the missions delegated by the platoon leader.

Tell the platoon sergeant what you want accomplished and the standards you expect. He is then responsible for "cracking the whip" and getting the soldiers to execute the mission.

As the platoon leader, you must lead by example. You should get involved in the training of the platoon by continually spot-checking your noncommissioned officers (NCOs) and ensuring they carry out your orders.

However, do not forget one fundamental rule: The platoon sergeant is the individual who "makes it happen." Do not usurp his authority by issuing orders directly to the soldiers in the platoon unless absolutely necessary.

The platoon sergeant will ensure mission accomplishment by using his squad leader chain of command. This allows him to develop his junior NCOs and maintain the chain-of-command structure.

A strong working relationship with your platoon sergeant also will help you accomplish another important task: the change-of-command inventory. Before signing a subhand receipt, the platoon leader must conduct a thorough and complete inventory.

In addition to the platoon sergeant, you may also seek assistance from the headquarters and headquarters company (HHC) commander and the supply sergeant.

Your rater, the HHC commander, is directly hand receipted for the class III/V platoon's equipment from the property book officer. He can provide you with most of the guidance you need to conduct the inventory. The HHC supply sergeant is a valuable source of information and should monitor the inventory.

These suggestions will enable you to conduct the inventory more efficiently—

. Make sure you have a current copy of your platoon's hand receipt and the modified table of organization and equipment (MTOE).

. Ensure a current component list exists for all the subhand receipts. The HHC supply sergeant should assist you in resolving any shortages. Remember, the outgoing class III/V platoon leader is still responsible for any equipment shortages you discover.

. Do not sign for anything unless you see it. If an item is missing, make sure your request includes the item's current document number.

. Have all of your subhand receipt holders present during the inventory and update their hand receipts before you sign yours.

. Sign all equipment down through the squad leaders to the individual soldiers who use it. Hand receipting to the user develops a sense of responsibility and usually results in equipment receiving better care and upkeep.

The class III/V platoon leader—from a "dirt bag" reputation to a most responsible and dedicated leader of the future—is in charge of one of the largest platoons in Army Aviation—an extremely demanding position.

Stressing the importance of property accountability within the class III/V platoon is essential. Conduct a thorough change-of-command inventory and continue to conduct periodic inventories, especially after each field problem.

As well as maintaining property accountability, a new class III/V platoon leader's becoming technically and tactically proficient as soon as possible is important. Once again, the platoon sergeant and the squad leaders are valuable sources of information.

These references will help you learn class III/V platoon mission and equipment—

. FM 1-104 (*Forward Arming and Refueling Points*).

. FM 10-68 (*Aircraft Refueling*).

. FM 10-69 (*Petroleum Supply Point Equipment and Operations*).

. Technical Manuals for the Heavy Expanded Mobility Tactical Truck and Forward Area Refueling Equipment.

. FM 1-112 (*Tactics, Techniques, and Procedures for the Attack Helicopter Battalion*), a valuable source of information that defines the attack battalion's mission, capabilities, limitations, and expectations of the class III/V platoon.

The class III/V platoon leader also is responsible for the acquisition, storage, and distribution of the attack battalion's unit basic load and training ammunition.

The officer in charge of your ammunition supply point, the battalion S3 (operations and training officer) and his training NCO, and the ammunition supply specialists within your platoon are reliable individuals who will assist you in this task.

Making the soldiers within the platoon give you informal classes on the capabilities and limitations of their equipment is beneficial. This allows the soldiers an opportunity to demonstrate their proficiency. Besides assisting you in learning about platoon's equipment, this allows you to assess the individual level of training within the platoon.

Once you have a basic understanding of the class III/V platoon's mission and equipment, you can concentrate on safely and

efficiently sustaining the attack battalion with petroleum, oil, lubricants, and ammunition.

The class III/V platoon leader enjoys a few benefits for having one of the toughest and most critical jobs in the battalion.

Contrary to popular belief, the class III/V platoon leader is normally able to accrue a respectable amount of flight time. As one of the six UH-60 Black Hawk pilots in the unit, you must fly to fill the three UH-60 aircraft assigned to the battalion.

The battalion commander normally places one of the three UH-60s in direct support of the class III/V platoon.

Another encouraging aspect of the job is that you operate with almost complete autonomy during field problems in one or more FARP sites separated from the battalion. After checking in with the S3 and S4 (supply officer) once or twice a day, you and the platoon are on your own to accomplish the mission.

You are one of the few lieutenants in the battalion who works directly with the battalion commander and primary staff. This lets you to see how the entire battalion operates and gain a clear understanding of staff planning and procedures.

Future class III/V platoon leaders will assume some of the most tough and rewarding jobs in the attack helicopter battalion.

One of the most rewarding aspects of the job is the opportunity to lead a large group of soldiers. A class III/V platoon leader is in charge of one of the largest platoons in Army Aviation.

Consequently, the position is extremely demanding and will force you to develop as a leader. Many think the class III/V is the best platoon to prepare a new lieutenant for a future company command.

Previously, the position of class III/V platoon leader had a negative reputation. No longer are battalion commanders putting their "dirt bag" officers in charge of the ammunition and gasoline.

Class III/V platoon leaders must be one of the most responsible and dedicated officers in the attack battalion.

Therefore, these are the three suggestions how Class III/V platoon officers can easily transition into new leaders: maintain a strong working relationship with the platoon sergeant; perform correct property inventory; and be proficient on the job.

These three suggestions will not guarantee a successful tour as the class III/V platoon leader.

However, they will ease the transition into your new job and point you in the right direction.

The Company Commander And Prephase Maintenance Management

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Any one who has been around Army Aviation for a while knows that phase inspections are causing problems in aircraft downtime. However, the problem is not necessarily systemic. Some units turn aircraft around on a regular basis much faster than others, which suggests that good phase inspection management is a strong factor in establishing acceptable turnaround times. Such management is not limited to the actual time the aircraft is in the shop. The period of time leading up to the inspection is the thrust of this article.

Smart prephase management is a cornerstone to successful maintenance operations. Management actions must begin long before an aircraft enters scheduled phase maintenance. To maximize aircraft availability and minimize phase time, the commander must examine the flying-hour program (FHP), aircraft-time flow chart, and prephase plan.

Flying-hour program. The first thing a company commander must do is determine an FHP that can be supported adequately by on-hand maintenance assets. He must ask the question: How many phase inspections can the unit realistically perform in a given period of time? If the unit is behind in phases from the previous year's FHP, this also must be considered. The FHP and maintenance resource coordination normally is done with the aviation unit maintenance (AVUM) commander or production control officer (PCO). Once determined, the FHP should be a balance of aircrew mission and training requirements, and maintenance resources. After establishing the FHP, the unit must establish and follow a planned maintenance flow.

Flowchart. The company commander must closely manage the flow of aircraft into phase inspection. A flowchart showing aircraft tail numbers and hours remaining before inspection is a great tool for this. We will look at the seven AH-1 Cobra aircraft assigned to a light infantry division attack helicopter company. Assuming a yearly FHP of 750 hours, the number of phases generated is five (750 divided by 150-hour phases).

The company commander must plan as far ahead as practicable with the PCO to determine where and when these scheduled inspections will take place. If the unit averages a 30- to 60-day phase completion time, one aircraft in phase at any given period is a good rule of thumb. In theory, a perfect spread between aircraft on the flowchart is 25 hours. (One aircraft is in phase and 150 hours are divided by the remaining six aircraft.)

Next, phase "bank time" becomes a measuring device on the posture of the fleet. Bank time is the total flying hours to phase for a fleet of aircraft. Optimum bank time is calculated by multiplying the number of aircraft by the phase interval, then halving that figure. For example, 525 is the optimum banktime for the seven aircraft in our example [(7 aircraft times 150 hours) divided by 2 equals 525 hours]. The goal is to keep the fleet of aircraft

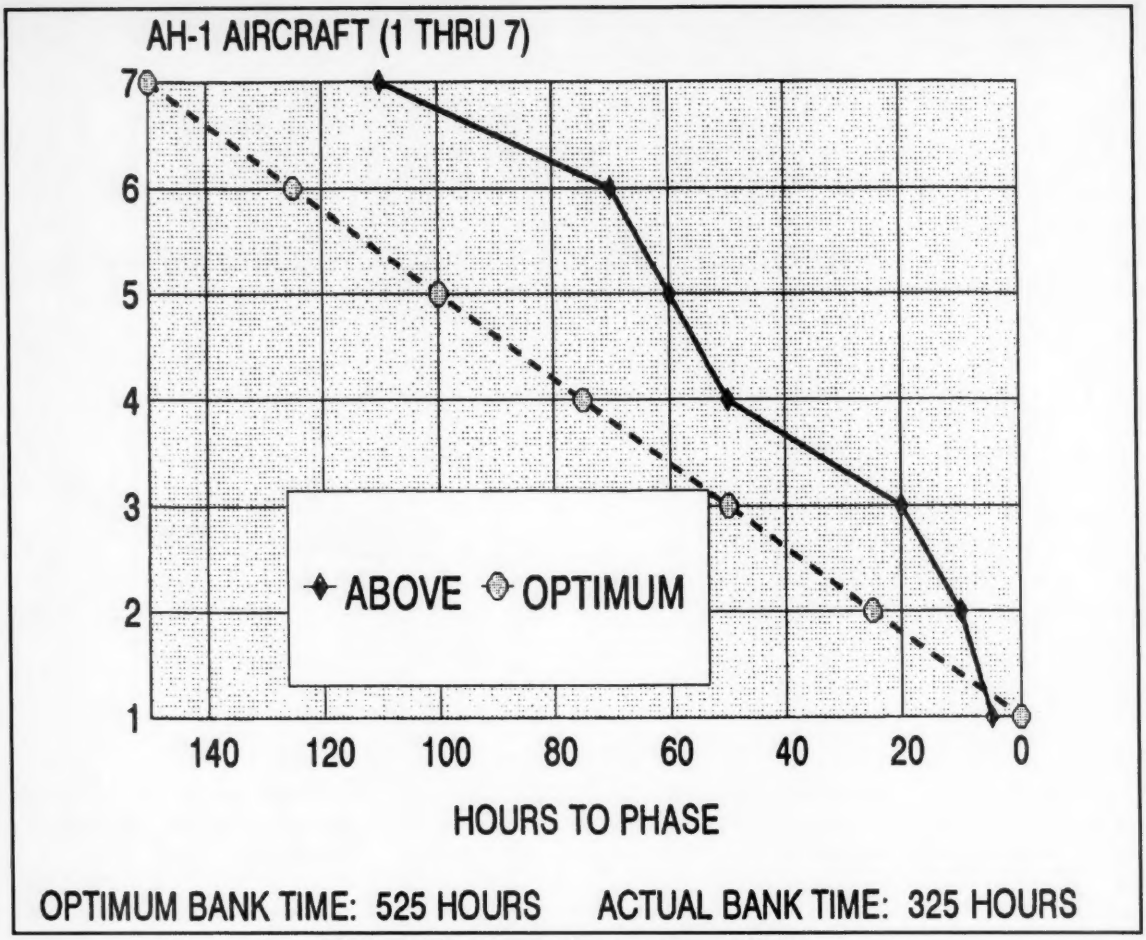


Figure 1. Company above optimum flow

at the flow line of 525 hours of optimum bank time. If bank time skews above (figure 1) or below (figure 2) the optimum, the commander should schedule aircraft to bring them back on track.

Anything less then an acceptable maintenance flow can result in aircraft "stacking up" in phases, which hinders the company's tactical mission and decreases aircraft availability. Though a company-level flow is easiest to manage, a battalion flow is highly desirable because it gives the battalion commander a complete picture of the fleet, and with it, greater flexibility.

Prephase plan. Besides establishing effective aircraft scheduling procedures, the commander must focus on making sure maintenance resources are in place to perform phase inspections. A prephase plan must be included in the unit's standard operating procedures.

The plan should include, at a predetermined number of flying hours (or anticipated calendar days) before the inspection is due, a thorough review of all maintenance records. The review should include all logbook form entries, time change component records, and deferred maintenance.

This review gives the commander an idea of how involved the phase will be. It also identifies the initial repair parts needed so that, if not already requisitioned, they can be ordered immediately to ensure they are on hand when the aircraft enters the inspection.

When ordering parts, care should be taken to ensure all necessary common hardware for replacement components is available or on order. Submitting requisitions 30 aircraft hours or 45 days out is an acceptable rule of thumb. However, this varies depending on the unit's geographical location and priority designators. Continuously following up on these requisitions will help minimize

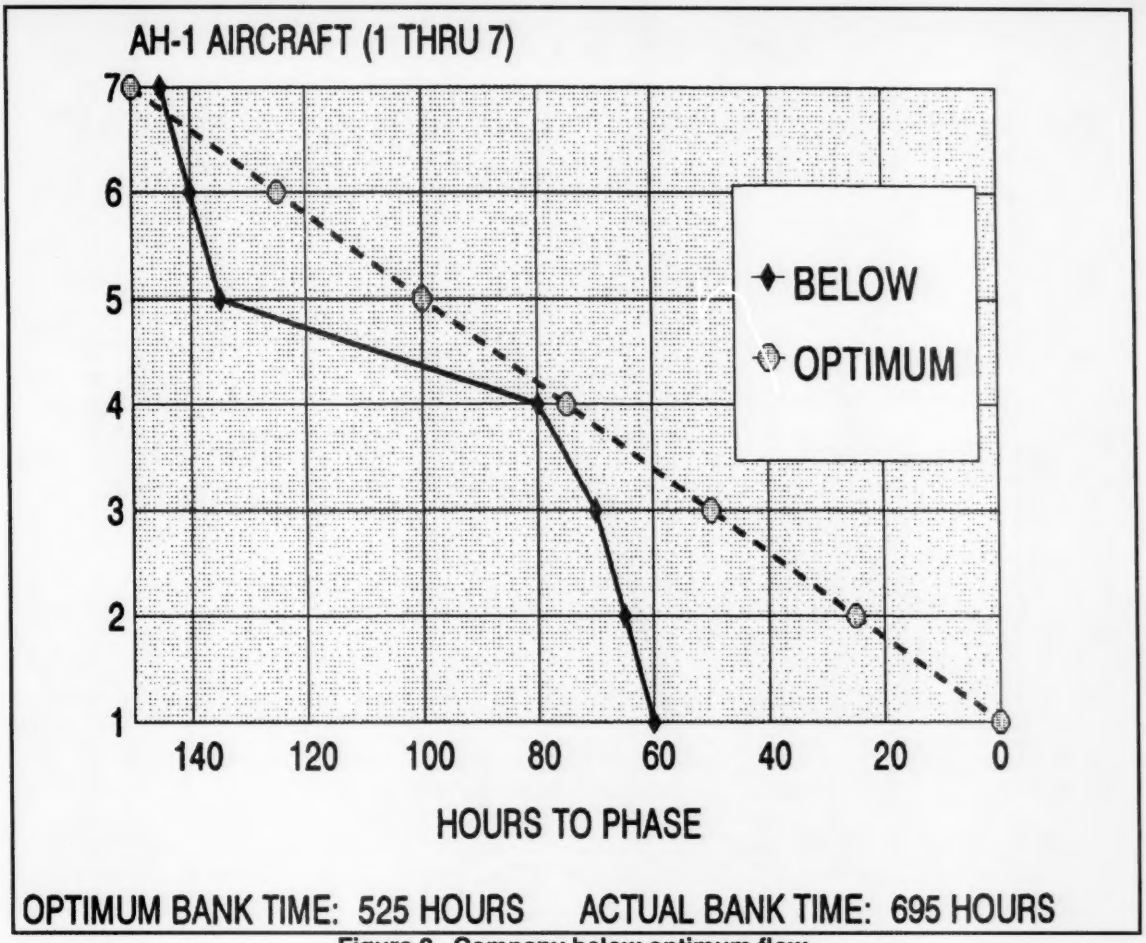


Figure 2. Company below optimum flow

surprises when the aircraft enters phase.

A decision must be made upfront to determine whether the AVUM or aviation intermediate maintenance will perform the phase. Personnel availability, current workload, and existing work distractions are key factors in making this decision. Further, availability of special tools, test equipment, ground support equipment, and facility assets change continuously and must be considered in the decision. Such items, if not adequately planned for, will cause a chokepoint in the phase.

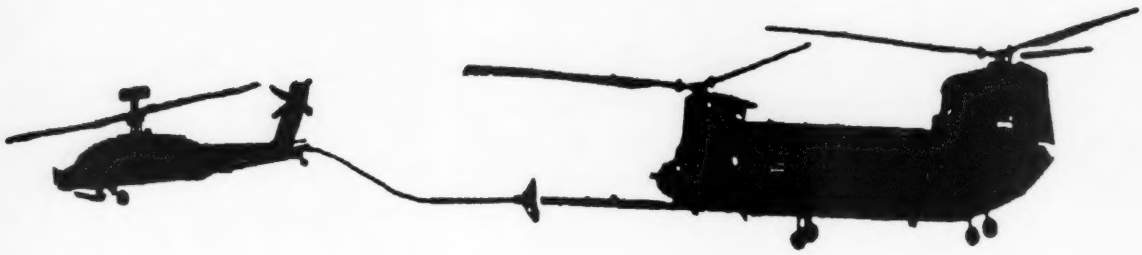
Personnel assets, as well as support equipment items, need to be programmed. Whenever possible, specific crews should be identified ahead of time, and efforts made to ensure they will be available to devote adequate time to the inspection. Some units exempt from duty work crews for the period they are working a phase. This means they are not subject to normal distractor duties (guard, company detail, etc.). This can only be done if people are identified in advance of the phase.

When an aircraft is actually work ordered into phase, conducting a thorough prephase test flight will identify problems that could otherwise go unnoticed until the postphase test flight. After the initial test flight, component oil samples should be taken, the engine flushed, and a complete aircraft washing performed. The aircraft is now ready for phase. The preinspection work has been done.

Prephase management capitalizes on the FHP, maintenance flow, and the prephase plan. When aggressively pursued, these activities will greatly reduce phase time and allow the company commander to focus greater attention on unscheduled maintenance. Smart prephase maintenance management enables the company commander to maximize aircraft availability. ❐

Aerial Refueling

An Army Requirement for the AH-64 Apache?



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INTRODUCTION

Aerial refueling of helicopters is not a new concept. Obviously mission requirements drive its adoption. Tactical requirements have not sufficiently justified its use by U.S Army helicopters until recently. The sheer size of the total engagement area in the war with Iraq necessitated a change in employment philosophy for the Army's first line attack helicopters.

The AH-64 Apache was tasked with neutralizing some key radar installations deep within Iraq to open Operation Desert Storm. To accomplish this task, a 700-nautical mile (nm) flight, one way, was required. This had to be done at night, low-level and undetected, to maintain the element of surprise.

The Apache has a normal combat radius of 150nm. Tradeoffs were made, and a bold plan was successfully executed. Aerial refueling would have offered another attractive alternative in lieu of the high risk of landing in enemy territory for refueling.This article begins and ends with displays of inflight aerial refueling operation alternatives for the Apache with an MH-47 and C-130.

HISTORY

Refueling helicopters from fixed-wing aircraft while in flight owes its beginning to the onerous phenomenon called "wake turbulence." That may sound strange, but the investigation and understanding of wingtip vortices pointed the way to a useful application of the dreaded phenomenon.

The feared wingtip vortex of high-energy, swirling air was due to the conical airflow off the aircraft's wingtips and flaps. The higher pressure area under an aircraft's wing induces a flow around the wingtip to the lower pressure region above the wing. This cone of swirling air trails out behind each wingtip. It slowly dissipates and causes aircraft control

problems for aircraft landing and taking off through these regions of disturbed air. The wingtip vortex was felt when fighter aircraft flew in tight formation, but in this flight regime no flight control problems were noted.

A brilliant, unsung aeronautical engineer realized this high-energy-flow field could be used to generate lift on a helicopter flying at the top of this conical corridor. This "freelift" from the wing's upwash could be used to decrease the torque required to fly at a given airspeed. This power reduction greatly increased the helicopter's range, by 20 percent or more. Similarly, it could be used to fly 20-percent faster in level flight at the same power setting, thus decreasing the en route time significantly without increasing fuel consumption.[1]

In the early 1960's, the capability and reliability of the military helicopter were increasing significantly. This increase fostered widespread acceptance and resulted in larger, and more plentiful, numbers of helicopters. However, the forward speed and range of helicopters did not increase proportionately. This was primarily due to the helicopter's inherent aerodynamic constraints.

The U.S. Air Force (USAF), driven by the long-range rescue requirement, realized the desired helicopter performance could be gained by exploiting the wake turbulence phenomenon and developing a method for aerial refueling. The C-130 Hercules was the logical choice for the tanker, as it already had an operational probe and drogue aerial refueling system.

This system used a high- or low-speed drogue, depending on the type of fixed-wing aircraft being refueled, such as the F-100 Super Sabre, F-101 Voodoo, A-4 Skyhawk, or A-37 Dragon Fly. The helicopter chosen was the Sikorsky H-3 Sea King, destined to become the Jolly Green Giant.

Initially, the Aeronautical System Division (ASD) at Wright-Patterson Air Force Base (AFB), OH, flew a feasibility test in 1965. This test showed good compatibility between the CH-3 and the C-130, but the performance savings were not quantified. ASD flew additional tests that confirmed a significant power reduction and qualitatively defined the optimum drafting position. A follow-on test program at the Air Force Flight Test Center, Eglin AFB, FL, quantified the power reduction when flying in the wingtip corridor to be 28 percent, which resulted in a 25-percent increase in range.[2]

This proof of concept led to the rapid development and qualification of a complete aerial refueling kit for the helicopter. It consisted of a telescoping probe and a fuel control panel with attendant plumbing to allow selective filling of the internal fuel tanks and newly added external drop tanks. A telescoping probe extended the probe forward of the tip path plane. This increased safety and reduced pilot workload. For emergency purposes, refuelings with the probe retracted also were safely demonstrated.

OPERATIONAL DEMONSTRATION

A pair of H-3s, with augmented crews, flew an operational demonstration of aerial refueling in 1967. They flew Lindberg's route from Roosevelt Field, Long Island, NY, actually departing from Floyd Bennett Field, as Roosevelt Field was closed, to Le Bourget Field outside Paris, France.

The flight took 30 hours and 46 minutes and required nine aerial refuelings. En route weather forced a diversion and extended the flight distance to 4,270 miles. This compared to Lindberg's unrefueled flight of 3,610 miles in 33 hours and 39 minutes.[3]

This test solidified the acceptance of aerial refueling helicopters within the Air Force. The existing H-3 fleet, with a few exceptions, and all subsequent H-3s manufactured had aerial refueling kits installed. This was at the time the war in Southeast Asia (SEA) was heating up and many missions were being flown into North Vietnam.

WARTIME USE

The first H-3s deployed to SEA were not aerial refueling capable (CH-3Bs), but the Jolly Green Giants, HH-3Es, that replaced them had two aerial refueling systems. Besides aerial refueling from aircraft, they also could aerial refuel from ships. Aerial refueling from ships without landing was called HI-DRINK or HIFR (helicopter inflight refueling).

This consisted of hovering over the fantail of a destroyer underway, lowering the hoist to pick up the fuel hose, and lifting the hose to the refueling fitting on the side of the helicopter.

Aerial refueling (both kinds) added immeasurably to the success of the search and rescue forces in SEA. Aerial refueling allowed 8- to 12-hour missions to be conducted without interrupting the mission to refuel at the nearest land base.

I once flew an H-3 for over 8 hours with only one landing and that was on a hospital ship to drop off two pilots we had rescued before returning to the mission still underway. The H-3 was severely power limited in the hot and high terrain of SEA and could not hover out of ground effect (OGE) at high gross weights.

To solve this problem, it was necessary to drop the external fuel tanks and dump internal fuel before committing for a recovery. The external tanks were not filled with foam and presented a safety problem if hit by a tracer round. Dumping the fuel lowered the gross weight and provided a safe OGE hover power margin. Enough fuel was saved for the recovery plus fuel to rendezvous with the tanker.

These actions made the H-3 completely dependent on aerial refueling as it no longer had enough fuel to get home. These procedures stayed in force until the H-3s were replaced by the HH-53s.

An HH-3E in observation position before aerial refueling operations with an HC-130P

LONG–RANGE DEPLOYMENTS

When the H-53s replaced the H-3s in SEA, high confidence already existed in helicopter aerial refueling. Two of the early H-53Bs being retired from combat were flown back to the United States to position the crews for a return flight in replacement H-53C models. The flight started at Udorn, Thailand, without ferry tanks. It was necessary to stop at Ubon Air Base (AB), at the Vietnam border, to refuel before going on to Da Nang AB, Republic of Vietnam, to pick up the 650-gallon (gal) external tanks and rendezvous with a tanker for the cross oceanic flight. From Da Nang AB, it was an easy hop to Clark AB, Philippine Islands, and on to Kadina AB, Okinawa.

The legs increased in length as the aircraft progressed on to Misawa AB, Japan,and toward Shemya AB in the Aleutians. On this 1ong leg of 1,500nm, a chip 1ight in the main transmission on an H-53 forced an emergency landing at Nyuta Baru, a Japanese defense base, for a transmission change. Then . . . on to Anchorage, AK, before turning south to McCord AFB and on into Hamilton AFB to complete the 8,019nm trip.

The crews took 2 weeks' leave before starting the return trip. They picked up two new helicopters at Eglin AFB, FL, and headed back with the tanker. It required at least 4 aerial refuelings each day, and nine landings for crew rest to make Udorn AB (Ellsworth AFB, SD; Edmonton, Alberta; Elmendorf AFB, AK; Shemya AB and Misawa AB with a weather divert into Yakota, Japan, and on to Kadina AB, Clark AB, and Da Nang AB).

The H-53s were refueled often to maintain enough fuel, when possible, to return to land if refueling became impossible for any reason. They flew the 9,174nm return trip with no maintenance problems and only one weather divert/hold.

The round trip required 137.9 hours of flying time or about 70 flight hours and 12 aerial refuelings each way. A test of crew endurance to be sure, but 24 successful aerial refuelings attest to the utility of aerial refueling for long-range deployments.[4]

The H-53 had a greater power margin than the H-3, so it was not necessary to jettison its 450-gal external fuel tanks. The tanks were filled with foam to prevent explosion if hit by tracer rounds. Early in the conflict, the H-53s orbited over Laos just south of where the action was in North Vietnam. Other H-3s and later H-53s were on station off the coast of North Vietnam. They stayed on station from the start of bombing each day and went home at sunset. This required numerous aerial refuelings for the

A C-130P in formation takeoff with an HH-3E in the drafting position at Selfridge ANGB, MI

11-hour orbits. A tanker was always available for the return trip to home base.

OPERATIONAL APPLICATIONS

With aerial refueling capability on most H-3 and H-53 helicopters within the Air Force, numerous missions can be cited that were easily flown but would have not been possible without aerial refueling. A composite Air Force Reserve squadron (C-130s and HH-3Es), the 305th Aerospace Rescue and Recovery Service deployed half of its aircraft and people from Selfridge Air National Guard Base (ANGB), MI, to Anchorage in 2 days using its own aircraft.

The only en route landing for the two helicopters was for crew rest in Edmonton after flying for 12 hours. Twelve hours later they were back in the air again, and 13 hours later they all landed in Anchorage. The 2,600 miles were covered in 2 days by aerial refueling four times each day, but would have taken at least another day if ground refueling were used. Twelve hours after arriving in Anchorage, they were flying a local training sortie.

Before this long-range deployment, the squadron flew a shorter overwater mission to demonstrate the wartime deployment capability. Two HH-3Es flew nonstop with one C-130 from Selfridge ANGB to Kindley Naval Air Station, Bermuda.

This flight used four aerial refuelings for the 1,067-mile trip, but also proved the advantages of drafting in reducing en route time. Drafting or flying in the maximum efficiency region of the vortex can provide dramatic performance gains. In this case, the H-3 cruised at dive speed (142 knots indicated air speed (KIAS)).

With the helicopter tucked in the drafting position, the C-130 increased airspeed to the helicopter's maximum allowable airspeed. This was possible without exceeding the maximum continuous engine/transmission limits.

Drafting is possible from the start of the takeoff roll to the touchdown at destination. The torque reduction realized in the drafting position can be used either to save fuel or cruise faster.

One would expect the AH-64 to draft at near its maximum allowable airspeed, but a flight test will be required to quantify its drafting efficiency.

ARMY REQUIREMENTS

The MH-47s assigned to the Special Operation Forces' mission already satisfy the Army's most immediate requirement for helicopter aerial refueling. The Special Op-

erations units are set apart from the rest of the Army and do not reflect overall doctrine.

Recently, the AH-64s of Desert Storm were called on to perform a deep strike mission. They were not very compatible with the other long-range assets in the raid because of the Apache's limited fuel supply. The addition of long-range fuel tanks increased sustainability. Even so, a remote desert landing was required to complete the mission. The fuel tanks were carried at the expense of ordnance as they were mounted on the weapons pylons.

Aerial refueling capability would give the Apache flexibility in configuration. External tanks could be added, as necessary, to match the requirements of the other aircraft on the mission. The deciding factor would become the time, in terms of fuel, between availability of aerial refuelings.

A portable strap-on system for aerial refueling would be ideal. It would not inhibit normal short-range missions, but could be added quickly for specific mission requirements.

For the quick deployment of Apaches to anywhere in the world, crew endurance would become the limiting factor. The Apaches could be deployed with weapons up if going directly into a hostile area or performing an attack mission en route. For the low-threat, long-range deployments, only gun ammunition and air-to-air (ATA) weapons could be carried with four external tanks. This ferry configuration would greatly extend the time between aerial refuelings and allow return fuel to land during the long overwater legs.

HH-53C aerial refueling over Laos (view HC-130P door)

JAAT MISSION

The Army could define certain units as quick reaction units and provide training with the other service assets that they would be working with if deployed. This would mean training with the C-130 assets and the attack aircraft in the close air support role and deep strike missions.

The joint air attack team (JAAT) mission would be greatly enhanced by giving the AH-64 an aerial refueling capability. This would give the Apache equal partnership with the C-130s and the A-10 Thunderbolts.

EXTENDED LOITER

Any time an extended loiter period is required, aerial refueling becomes invaluable. When long loiters require a ground refueling without expending ordnance, time and assets are wasted. Once the battle is joined, the aircraft should remain on station until ordnance is expended or the mission is complete.

Aerial refueling allows aircraft to survive long delays and remain mission capable. If the mission Apaches BINGO for fuel, another section must replace them, or the mission goes naked until the attack helicopters are back on station.

An important consideration frequently overlooked is cycling the system (entire helicopter as a system). This provides another chance for a failure of a critical component. Once the system is up, it should be kept running as long as possible or at least until mission completion.

This becomes a significant factor in aircraft availability when the progress of the battle requires high availability for success. This is true for almost any mission flown, and is especially true for long endurance missions.

Aerial refueling also eliminates the colossal loss of mission wasted by ground refueling operations. In the Iraq war, C-130 tankers remained airborne on prearranged tracks to aerial refuel anyone needing gas.

SPECIAL OPERATIONS MISSION

If the AH-64 is ever to become a full-time Special Operations resource, I suggest an automatic coupling—similar to the aerial refueling mechanical coupling—will need to be developed for operations using HIFR from Navy destroyers. It could be a strap on unit, quickly installed, for specific missions. The HIFR provides a

backup refueling capability that may be required during long overwater deployments because of tanker nonavailability or extreme weather conditions.

LONGBOW APACHE MISSIONS

The Longbow Apache will have an ATA radar detection capability and, theoretically, could provide ATA defense for the area within its radar coverage. Assuming that most weapons stations will be carrying ATA weapons (radar or heat-seeking missiles), there is no need to BINGO for fuel until all missiles are fired or the mission is complete. Aerial refueling makes this possible.

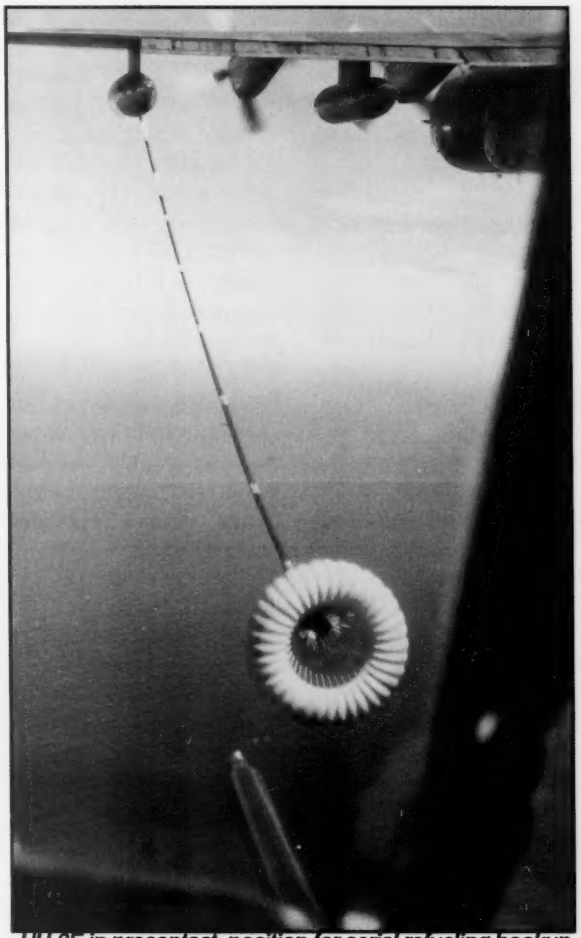
Aerial refueling also adds some flexibility. There is no longer a need to conserve fuel to extend loiter time. Frequent and high-energy maneuvering become possible.

This concept also is true when an antiradar missile, such as Sidearm, is used to go after a radar threat that is not emitting. The helicopter loiters in the area until the threat comes up and then makes the kill. All these things are possible if an aerial refueling system is developed and qualified for the Apache.

FLIGHT TEST DEVELOPMENT

A flight test should be flown with a tanker aircraft to quantify the performance increase in the optimum drafting position. The maximum speed in level flight, while in the drafting position, should be determined at light and heavy gross weight. Aircraft controllability in the hookup/disconnect position and transition to the aerial refueling position should be investigated.

If the results are favorable, a refueling boom should be designed and fabricated for a full aerial refueling flight test. The original aerial refueling tests on the H-3 required 11 flights in 19 days. A similar program time could reasonably be expected for the Apache.[5]



HH-3E in precontact position for aerial refueling hookup

EQUIPMENT AND PROCEDURES

No changes to the C-130's aerial refueling system, or to the crew's procedures, should be required. For the aerial refueling installation, the C-130 has additional fuel tanks that almost fill the cargo area of the cabin and external fuel tanks between the engines under each wing (about 12 hours of fuel).

The tankers have two other pods, one on each wing, outboard of the outboard engines. The pods contain a fuel hose, takeup reel, and a series of three indicator lights at the rear of the pod.

The red indicator light notifies the helicopter crew that hydraulic power failed in the pod, rendering the takeup reel inoperative. The yellow light shows that the tanker is ready for aerial refueling. The green light illuminates when fuel is flowing from the C-130 to the helicopter. The system of lights permits radio out aerial refuelings for communication security, giving the crews all the information required to conduct a silent aerial refueling.

The hose trails out 81-feet behind the pod, marked with white bands for easy recognition. The aerial refueling range is 20-feet long, marked by two wide bands on the hose. The first band is 5-feet down the hose from the pod. The hose must be pushed into the pod, slack taken up by the takeup reel, the 5 feet to the first marker before fuel will flow. The flow will stop if the other end of the refueling range marker enters the pod too close.

The drogue is a nylon doughnut half 46-inches in outside diameter, with a 27-inch inside diameter. The doughnut attaches by a series of metal spokes that taper down to the mechanical coupling.

This forms a funnel basket to guide the probe for contact. The drogue collapses inside the pod when reeled in and inflates with the airflow when the hose extends.

The probe must engage the mechanical coupling with 140 pounds of force to make a successful union. Once

coupled, fuel pressure in the hose locks the coupling, it requires a 420-lb force to disconnect the union. The low-speed drogue is steady between 130 and 105 KIAS and tends to whip or flop around when outside this range.

The helicopter's telescoping probe extends the probe out beyond the rotor tip path of the helicopter. This allows greater rotor clearance from the hose and basket if turbulence forces a miss during a run-in for hookup. Turbulence can create a problem because the gust response of the three dynamic vehicles (the C-130, the helicopter, and the basket) is different.

The H-3s have a panel to select where the fuel will be transferred during the aerial refueling. Any, or all, the internal or external tanks can be filled by selection. Individual flow sensors indicate when the external tanks are full. The helicopters also have an engine oil tank in the cabin to resupply oil to the engine if an oil low light illuminates in flight.

The formation joinups for aerial refueling are a "piece of cake" for the helicopters because the C-130 does all the work. The helicopter can go to a prearranged location or aerial refueling track at a prearranged time, or it can merely request immediate refueling at its present position.

En route to the aerial refueling, the C-130 will complete an aerial refueling checklist and brief the helicopter on the heading, airspeed, and altitude to be used. When the tanker arrives in the area, the helicopter sets up for the aerial refueling and waits for the tanker to come abeam.

The C-130 locates the helicopter using its radar, ATA tactical airborne navigation, or map coordinates. Using one of several joinup procedures, the C-130 drives up behind the helicopter from 200-feet below and offset to the helicopter's right side. The C-130 comes abeam the helicopter and becomes formation lead, allowing the helicopter to join down on the tanker's left wing.

When all pre-contact checklists are complete, the helicopter is cleared to refuel by radio or light signal. The helicopter maneuvers to line up its probe on the basket and closes on it at a reasonable closure rate. If the probe misses the basket, the helicopter slows, realigns, and tries again.

After contact, the helicopter climbs outward to the aerial refueling position and receives the fuel. The helicopter can be given a specific amount or top off any or all tanks. The flow light in the pod goes out to show when transfer is complete and the helicopter can disconnect. To disconnect, the helicopter returns to where it first made contact and reduces airspeed until it disconnects.

The helicopter can aerial refuel from either side of the tanker, but the left side is preferred as it provides greater clearance between aircraft. Because of the probe's location on the helicopter's right side, the helicopter to tanker clearance is reduced by the width of the helicopter when aerial refueling on the C-130's right side.

Contact and disconnects result in the helicopter's rotor being partially immersed in the propeller wash from the C-130's outboard engine. This turbulence and downwash may be too great for the helicopter. This forces it down and out of the formation and usually requires a re-join.

The helicopter may have suffered an engine failure so it does not have enough power to maintain airspeed and altitude for a normal aerial refueling. If so, an alternate procedure can be used. For the single engine case, 500-feet separation in altitude is used for the joinup, with the helicopter at its maximum capable, level, flight speed.

The C-130 comes abeam at that speed or, if unable to slow to that speed, maintains its minimum control airspeed for conditions (gross weight and density altitude). The helicopter trades the additional altitude to airspeed and descends right onto the drogue. The procedure must be repeated if no contact. When altitude allows, the C-130 can use a slow descent to assist the helicopter with its airspeed/power problem.

An emergency "breakaway" can be called at any time by either aircraft. This requires an immediate disconnect and breakaway between all aircraft in the formation. Emergency procedures specify crew actions for fuel siphoning from the probe (valve stuck open), aerial refueling with a nonextended probe, aerial refueling with hydraulics out on the pod, and hose jettison from the C-130.

Normal procedures determine crew actions for night aerial refueling. With and without night vision goggles, low-level down to 100-feet above ground level (AGL), and for formations of helicopters. Low-level aerial refueling, especially suited to current Army doctrine, may well become its most urgent requirement. The Air Force has demonstrated routine night aerial refueling operations at 300 feet AGL and 100 feet for daytime aerial refueling.

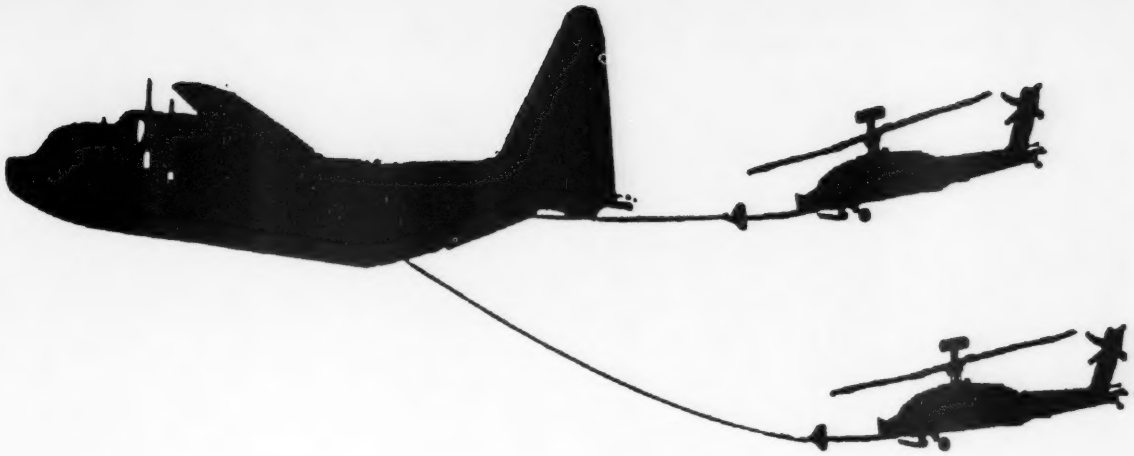
DESIGN ALTERNATIVE

The above discussions use existing equipment and procedures. The Army can be a bit more innovative in its designs as it is starting with a clean sheet of paper.

The F-15 Eagle has a set of external conformal tanks to carry more fuel without using ordnance stations while keeping drag to a minimum. The Apache could do something similar with a conformal tank on the belly for long-range missions. Some design tradeoffs may be necessary for the gun and ammo storage, but that is a function of mission requirements.

Pods are available with a self-contained extending probe. This could possibly be adapted to a set of pods for the wingtip stations or for the under-the-wing stations. The ordnance requirements drive the wing station use, but all stations and adaptations must be considered.

A reduction in aerial refueling design choices may be seen once the basic aircraft design has been decided, but



they are not totally eliminated. The mission requirements drive the design alternatives and design tradeoffs. The Apache is a powerful machine that has more mission capability than is presently used. Innovation can tremendously increase its capability.

The use of a helicopter as a tanker has not been tried yet, but it seems like a good idea that should be explored.

The MH-47 or the H-53E would be good candidates as they already have a refueling boom and have large useful loads capability. This means that the helicopter tanker could replenish its gas from the C-130 and give gas to the Apache (and UH-60 Black Hawks, for that matter).

The helicopter refueler could be fitted with a roll-on system. This would include additional fuel tanks, a hose, and reel with a drogue. Another possibility would be to fit the AH-64 with a hose and drogue, trailing from the tail cone, and let the MH-47 pump the fuel up to the AH-64 through its probe. Again the mission requirements will drive the choices.

OTHER CONSIDERATIONS

The down side of this discussion is where do the tanker assets come from and who is in control? This need not set off another roles and missions squabble between the Army and the Air Force. The requirements must be carefully defined and justified to a sufficiently high level to ensure interservice cooperation.

The aerial refueling concept holds great potential for the Army to significantly increase its attack helicopter deployment, mobility, and tactical capabilities, but may require Air Force support and close coordination. The war in Iraq showed that, when this cooperation was achieved, dramatic results were attained.

The burden must be lifted from the operational field commanders to adapt their tactics, using high-risk makeshift plans, to accomplish long-range battlefield tasks. The answer is to secure the assets, make the modifications, and train the players in a realistic manner before the conflict with the best equipment possible.

The C-130 may not be the only candidate for a tanker, but no tanker will be provided without the requirement being established. It's up to the Army. ❑

NOTES

[1] "USAF Technical Report No. 67-4, Range Extension of a CH-3C by Flying in Formation with an HC-130H," Air Force Flight Test Center, Edwards AFB, CA, July 1967.

[2] Ibid.

[3] Colonel Charles R. Dunn, USAF (Ret), Interview (pilot who flew on the mission), Wilmington, DE, 5 Apr 91.

[4] Major John D. Harris, USAF (Ret), Interview (pilot who flew on mission), Euless, TX, 23 Apr 91.

[5] USAF Technical Report No. 67-4, p. 1.

Tools For Readiness

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From day-to-day experiences around the house, everybody knows what the impact is of not having the right tool for the right job. Situations like not having your own tool, or not being able to find it—or having a brand new tool break halfway through a job and not being able to get another one because "all the stores are closed"—are frustrating. When a similar situation occurs for an Army mechanic trying to put a $16 million aircraft back into the battle, we have a big problem. This is a problem the U.S. Army Aviation Logistics School (USAALS), Fort Eustis, VA, and the General Services Administration (GSA), Washington, DC, want to eliminate.

The Directorate of Combat Developments, USAALS, has been working for years to develop a system to get high-quality tools into the hands of our Aviation maintainers. The goals are to put a system in place that ensures rapid, efficient tool procurement and shipping, and provide stackable, rapid inventory toolboxes to replace the burdensome "toss the tool into the box" versions currently in the field. Meeting these goals inherently will provide quantum improvements in maintenance support productivity, which directly translates to higher aircraft readiness rates.

The USAALS new aircraft tool system (NATS) program objective is to replace the general mechanic's toolkit with one that features a stackable (flat) toolbox with a quick-inventory design. The box probably will be made of high-strength-to-weight plastic rather than metal, and will have an insert that provides readily identifiable places for each tool. The box will be lighter and more easily transportable than today's "Eisenhower" box, and will show when a tool is missing. Besides allowing quick inventory, this last feature should help reduce foreign object damage caused by accidentally leaving tools in critical aircraft areas.

In addition, the general mechanic's toolkit, the NATS program ultimately provides for replacing component repairmen boxes and aviation unit maintenance number 1 and number 2 shopsets. These efforts include weeding out tools never used, and adding tools needed but not currently issued. Tools seldom used are removed from toolkits and placed in toolrooms for issue as needed. That is, tool "streamlining" that also is a NATS objective.

The GSA standardization and control of industrial quality tools (SCIT) initiative will enhance the USAALS NATS program. That program gives customers (users) the flexibility to select the level of quality needed for common handtools, power tools, and other equipment, consistent with economic and safety considerations. It also includes warranty provisions and a system for rapid tool and equipment replacement. The GSA SCIT program is a multiple award source with some unique features such as—

- A 5-year contract to provide continuity.
- GSA stockage of items for customers to order through normal supply distribution channels, which will ensure a quick viable source of supply.
- Assign national stock numbers to each manufacturer's part number. No substitution will be made on a requisition. What you order is what you get.
- Items will carry the same warranty as in the commercial world. Replacement is quick and easy. A toll-free number will be provided in SCIT catalogs to work through, as will information on how to exercise warranty options. Quality of tools in the SCIT program is so good that last year only 211 of 5 million plus GSA-issued tools were returned through warranty option.
- Manufacturers will be able to add new items as state-of-the-art as the tool industry changes.
- Metric tools are included.

The 1-800 toll-free number and GSA's guarantee of replacing a broken tool with a new one within 48 hours after receipt of the phone call is a challenging task. The service does not stop there. Once the phone call is received, GSA obtains a replacement tool and completes a return shipping label, puts the two items inside a shipping container, and sends it to the repairman who has the broken tool. When the repairman receives the new tool, he puts the broken one into the same container, attaches the label to the outside, and shoots the container back to GSA. GSA then returns the broken tool to the manufacturer for replacement.

Realization of the USAALS NATS and the GSA SCIT programs is not far off. So, for those who for years have been unhappy with the quality of aircraft maintenance tools and the difficulty in getting replacements for tools that break a little too easily, have faith; your troubles are coming to an end. ❐

Switchology Takes the Mystery Out of the MARK XII IFF System

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This article informs the user about the MARK (MK) XII identification friend or foe (IFF) system. Knowing the IFF system will encourage the aviator always to use switchology in aircraft startup and shutdown procedures.

Switchology is the art of turning switches on and off in proper sequence. This practice will take the mystery out of the IFF system and keep aviators currently informed if they have to use their knowledge to operate the system for real.

The information in this article was taken from the Department of Defense AIMS 86-100, MODE 4 Handbook, May 1987, and Technical Manual 11-5895-1199-12, MARK XII IFF System.

According to Standardization Communication 148, September 1991, prepared by the Directorate of Evaluation and Standardization, Fort Rucker, AL, the MODE 4 Handbook is the standardization document to use.

Technical details have been omitted and conversational words have been used in this article to simplify understanding.

As aviators preparing for combat, we should understand this system that was designed to save our lives. Understanding MARK XII IFF is a mandatory evaluation task during standardization evaluation.

These questions should aid in your understanding of this system.

Questions (Q) and Answers (A)

1. Q. How do you spell AIMS?

A. Air Traffic Control Radar Beacon System (ATCRBS) Identification Friend or Foe MARK XII System.

2. Q. What is a transponder?

A. A radio transceiver, used in radio beacons, that automatically transmits a reply promptly on reception of a certain signal. In the military, both air defense weapon systems and air traffic control (ATC) will send this signal (interrogation).

3. Q. What is SIF?

A. SIF, or selective identification feature, allows the user to select replies.

MODE 1, with 32 possible replies located on the control head of the transponder, can be set by the pilot during flight.

MODE 2, with 4,096 possible replies located remotely in the aircraft, can be set by the pilot, but not during flight.

MODE 3/A: MODE 3, with 4,096 possible replies and located on the control head of the transponder, can be set by the pilot during flight. MODE A, used by civilian ATC, is the same as MODE 3.

4. Q. What is IFF?

A. IFF is identification, friend or foe. The interrogator transmits coded radio frequency pulses (two for SIF and several for the encrypted MODE 4) and the transponder returns a coded reply.

The transponder uses the spacing of these pulses to determine the interrogated mode. This, in turn, determines which SIF reply code or MODE 4 is the transmitted reply.

MODE 4, used by the IFF and crypto-secure, can be enabled or disabled on the transponder control head by the pilot during flight. MODE 4 codes must be loaded with a special keying device controlled by the unit's crypto officer. These codes, called A and B, each cover a 24-hour crypto period (48 hours total).

5. Q. Why use MODE 4?

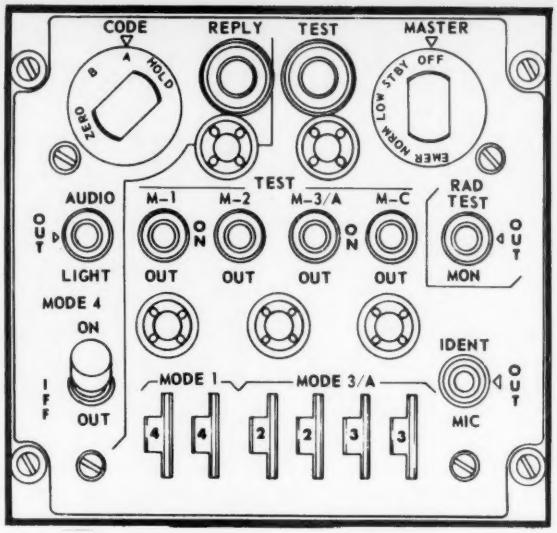
A. To reduce the possibiliity of fratricide! The crypto-secure feature of MODE 4 provides a positive

The AN/APX 72, also known as the MARK XII IFF Transponder Set, sends a coded signal to identify that aircraft as a friend or foe.

Switchology is the art of using knobs and controls to transmit these coded signals.

If aviators do not practice switchology, friend or foe will be a question for aviators in other aircraft.

Consequently, those aviators can only guess at the answer. It's this assumption of friend or foe that may cause fraticide in the event of war.



identification. This system will prevent friendlies from killing helicopters, but will not prevent helicopters from killing friendlies.

We cannot positively identify foes, because our aircraft are not equipped with an onboard interrogator. MODE 4 is essentially the only secure mode of the five MK XII modes.

6. Q. When do we use MODE 4?

A. Normally, we will use MODE 4 when we pass through friendly lines, going to the battle and returning. This allows friendly air defense to identify us beyond visual identification range.

7. Q. Is MK XII passive or active?

A. MK XII receives interrogations passively, but returns replys actively, if the transponder MASTER switch is in NORM (normal) position. When an aviator is near the friendlies, that person turns the MASTER switch to LOW to reduce the chance of enemy reception.

Generally speaking, aviators will place the MASTER switch to standby position (STBY) when passing our air defense line during movement to contact. This prevents the transponder from answering any interrogations.

This will also keep the transponder ready to operate upon switching to NORM when needed, avoiding the 2-minute warmup. However, local standing operating procedures (SOPs) may differ.

8. Q. What transponder controls affect MODE 4?

A. The following is a list of the transponder controls:

1. MASTER switch–controls entire transponder.

a. STBY (standby) – used for warmup period.

b. LOW – places receiver sensitivity on low.

c. NORM (normal)–places receiver sensitivity on normal.

d. EMER (emergency)–modifies reply codes for MODEs 1, 2, and 3/A to indicate in-flight emergency.

2. CODE CONTROL knob–permits selection of A or B code; enables operator to hold or zeroize.

3. AUDIO / OUT / LIGHT switch–When switch is in AUDIO position, the aviator will hear a tone to indicate that same person has been interrogated by a correct code.

One of two things will happen next: The MODE 4 reply light, next to the CODE CONTROL switch, will illuminate (APX 72 only) to indicate the aviator made a valid MODE 4 reply. Or the IFF caution light will illuminate to indicate the aviator has not made a valid reply.

If MODE 4 is on and if the computer is not keyed, the tone will be distorted into a constant "crackling" noise. In the LIGHT position, either MODE 4 reply or caution light will illuminate, but the aviator will not hear a tone.

4. Test light–illuminates when aviator holds M-1, M-2, M-3/A, or M-C switch to TEST position or when aviator interrogates M-1, M-2, M-3/A, or M-C with RAD TEST-MON switch in MON (monitor) position.

5. IFF MODE 4 on / out switch–allows transponder to reply.

6. IDENT/OUT/MIC switch –MIC position sends an identification code in MODE 1, 2, and 3/A every time you key the microphone button.

7. CODE CONTROL switch –Placed in the ON/IN/HOLD (all are correct terms), this switch provides a ground directly to pin number 32 of the KIT-1A that serves to enable, but not to activate, the code hold circuit in the KIT-1A.

The code hold circuit is activated by momentarily rotating the CODE CONTROL knob to the hold position. This places a ground on KIT-1A pin number 37. The combination of

these two input signals is required to activate the code hold circuit in the KIT-1A.

This switch is installed in the cockpit of aircraft with rigid landing gear, such as the AH-1 Cobra, UH-1 Huey, or OH-58 Kiowa. On aircraft with movable landing gear, such as the OH-6 Cayuse, AH-64 Apache, UH-60 Black Hawk, OH-58D, or U-21 Ute, this switch is a squat switch that activates automatically when the aircraft is on the ground.

9. Q. What does the caution light mean?

A. When the IFF caution lamp illuminates as soon as power is applied to the transponder, possible causes include–

1. The KIT-1A is installed, but not loaded.

2. The key that was loaded was invalid.

3. The KIT-1A failed its self-test cycle. When the IFF caution lamp illuminates during flight, possible causes include–

a. A failure in the transponder.

b. The MASTER switch is in STANDBY, which disables the transmitter.

c. MODE 4 ON-OUT switch set to OUT, which allows interrogations but not replies.

If you are in code A when you should be in code B, the transponder will not reply. The caution light will NOT illuminate and you will NOT hear an audio tone (APX 72). You will hear an audible tone if you are using an APX 100.

Therefore, if you forget to change from code A to code B, your first and only clue of your mistake may be the incoming missiles.

10. Q. How are the codes loaded into the IFF?

A. The process of loading the codes is called keying. This is done by the unit crypographic technician who sets the daily codes into the key gun (KIK-18). When the key gun is loaded, the technician takes it to each aircraft, opens the door on the computer (KIT-1A), and inserts the key gun into the computer. This transfers code A and B to the computer.

11. Q. When and how are codes changed?

A. The code is changed from A to B according to the unit SOP. The changeover time is the same ZULU time for all units worldwide. This time is classified CONFIDENTIAL. This time is designated in ACP-160 U.S. SUPP-1(C).

To change from code A to code B, simply move the CODE HOLD Knob from A to B. Keep in mind that all units may not change at exactly the same time.

12. Q. How do we hold the codes?

A. Two ways:

1. In aircraft with fixed landing gear (AH-1, UH-1, or OH-58).

a. After landing, place the CODE HOLD switch to IN/ON/HOLD. This allows the CODE HOLD knob hold position to function. This will also illuminate the IFF CODE HOLD caution light (not the IFF caution light) if the aircraft has this light on the caution panel.

b. Rotate the CODE HOLD Knob to Hold and release.

c. Rotate the MASTER switch to OFF.

d. Note: Set the CODE HOLD switch back to the OFF position before you take off. This allows the CODE HOLD switch to hold the codes when the electric circuit is ungrounded (aircraft in the air).

2. In aircraft with moveable landing gear (AH-64, OH-6, or UH-60).

a. After landing, rotate the CODE HOLD knob to Hold and release.

b. Rotate the MASTER switch to OFF.

c. Note: The squat switch (CODE HOLD switch) installed on the landing gear will perform its function automatically.

13. Q. How do you zeroize the codes?

A. There are four methods:

1. Turn the CODE HOLD knob to ZERO.

2. Open the door on the computer.

3. Remove the computer from its mount with power applied.

4. Turn the transponder off without first activating the CODE HOLD switch and/or without turning the CODE HOLD knob to HOLD. This will not zeroize the codes until about 15 seconds after the power is off. You, therefore, have some time to recognize your mistake, turn the power back on, and perform the holding procedure.

14. Q. What are the security requirements?

A. UNKEYED–The equipment gets the same protection as the aircraft gets. KEYED–The computer must be safeguarded as it now contains classified information (see AR 380-5).

Not A Mystery

Switchology does not have to be a mystery. Aviators can learn switchology with practice. If aviators routinely practice switchology, they will be able to identify friend or foe and avoid fraticide in the event of war.

Points of contact are CW5 Norman Stewart, New Jersey Army National Guard, DSN 445-9261; or Sergeant Dennis F. Heintz, Directorate of Evaluation and Standardization, Fort Rucker, AL, DSN 558-6309.

Maintenance Automation

A Challenge For The Future

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The world today is in the midst of an automation explosion. Technology is growing, with incredible breakthroughs in the reduction of hardware size and increased software processing speed. This technology represents a tremendous potential for Army Aviation maintenance.

Recognizing this potential early, Army Aviation joined the automation community and began to address maintenance requirements. Currently, many automation-related systems are under development, and a few have been fielded. Examples of projects now under development are the Unit Level Logistics System - Aviation, Integrated Family of Test Equipment (IFTE) (including the Contact Test Set [CTS]), and Comanche's Portable Intelligent Maintenance Aid. The Target Acquisition Designation Site, Diagnostic Troubleshooting Aid, and the Aircraft Vibration Analysis systems are examples of fielded projects.

All the above automation initiatives, whether fielded or under development, fill specific maintenance needs. However, with a variety of specific needs comes the problem of mix-matched proliferation of hardware and software. The problem is aggravated because of no standardization. This incompatibility problem is not limited to the world of maintenance support; a similar problem exists on the operational side.

Each system is made up of unique hardware and software, with the capability of importing and exporting data. We must look at the overall situation. We must ask ourselves: Do we really need a multitude of unique hardware and software systems strapped to our aircraft or in the hands of our maintainers and maintenance planners? With limited ground transportation assets, can we afford to sacrifice additional weight and space availability? What commander wants to sacrifice additional ammunition, troop, and equipment space, or aircraft performance capabilities, because of the weight and space requirements of "just one more" piece of automation or aircraft modification?

With such questions in mind, we easily can see the need for a small generic piece of hardware that can run a multitude of separate software programs. If capitalized upon, this "common thread" of hardware and software will save an incredible amount of money and time in the acquisition process. Better yet, it will enable the unit commander to maintain a higher state of aircraft readiness through smart, simple, standardized automation. Then the only unique materiel requirement would be the capability to transfer data between the computer and aircraft/component and vice versa. In the end, a tremendous savings would result, and the money could better be used elsewhere in Aviation.

The U.S. Army Aviation Logistics School (USAALS), Fort Eustis, VA, is working on a solution to the problem—the Aviation Maintenance Integrated Diagnostics System (AMIDS). The AMIDS is envisioned as a small, high-memory, lap-top computer. This solution would solve the standardization problem, to include automation compatibility .

With today's technology, the AMIDS could easily be one-fifth the weight and size of the IFTE CTS, fitting in an aircraft logbook holder. Originally, the CTS was considered as a generic automation solution for the Army but rejected as unrealistic for Aviation because

Continued on page 23.

Accurate Navigational Planning For Aviators

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Flight planning is a very important part of any aviation mission. The more accurate that planning can be, the more likely the mission will succeed. Precise planning allows for increased safety through accurate fuel planning, route timing that deconflicts you with artillery suppression of enemy air defenses (SEADs), and other units' operations by ensuring you will be where you are supposed to be at the proper time.

Advanced aircraft like the AH-1 Cobra, AH-64 Apache, UH-60 Black Hawk, and CH-47 Chinook use navigation systems to provide point-to-point information in flight. Other aircraft must rely on detailed map reconnaissance and planning. These aircraft can benefit from an efficient, accurate technique for planning routes.

Currently, most flight route timing is done by placing a straight edge or string on a map to get distance and a protractor or compass is used to get heading. This method is fine if you have access to a large, flat, wall-mounted map. Usually (especially in the field), an aviator uses his folded cockpit map that does not lend itself well to measuring around corners.

I have developed a technique for planning routes that is very precise and, with a little practice, is efficient. Other aviators may be using similar methods and anyone with a little mathematics background will find this method obvious, although they may not have thought of it. This method requires simple math and your E-6/B flight computer. Our unit uses this type of planning for every mission and makes a habit of hitting passage points and battle positions within 1 or 2 seconds of the planned times. Aircrew training manuals require the standard to be only ± 3 minutes.

Required Navigational Data

You will need the following route information:

- A list of accurate checkpoints.
- The speed you want to fly each leg, or the time you need to be at each point (or a combination).

Results

Using this method, you will get the following navigational information:

- Exact distance between points in kilometers (km)
- Exact true course to the next point in degrees.
- Exact time for each leg in minutes and seconds.
- Exact fuel required for each leg in pounds or gallons.

Procedures

The following steps outline my method for accurate navigational planning:

Step 1. Start with the list of checkpoints. Learn to visualize a universal transverse mercator (UTM) coordinate as what it is—a point on a surface represented by a pair of numbers. The old rule of reading grids as "right and up" really means to find the x and y coordinates of a point on a graph. Therefore, the letters and numbers of a coordinate can be separated into their x(east) and y(north) components. Also, a decimal point can be inserted after the first two digits of each component so that it directly represents kilometers. If I am losing you, hang in there, it is not as hard as it sounds.

You can see from the graph (figure 1) that to get from point 1 to point 2, you must travel 17.24 km east and 6.45 km north. To get these numbers, subtract the start point from the end point for component.

98.94	46.75
-81.70	-35.25
17.24 km east	11.50 km north

Step 2. On your E-6/B flight computer, look at the "wind side" (clear screen). Most E-6/Bs have a section on the slide bar that is marked in square grids. Place this section under the dial and rotate the heading wheel so it is set on north at the top (figure 2).

Step 3. Starting at the center dot, move right (east) 17.24 squares (if

Grid 1: PK 8170 3525 can be broken down as follows:

x-component (east)
P 81.70 km

y-component (north)
K 35.25 km

Grid 2: PK 9894 4675 can be broken down as follows:

x-component (east)
P 98.94 km

y-component (north)
K 46.75 km

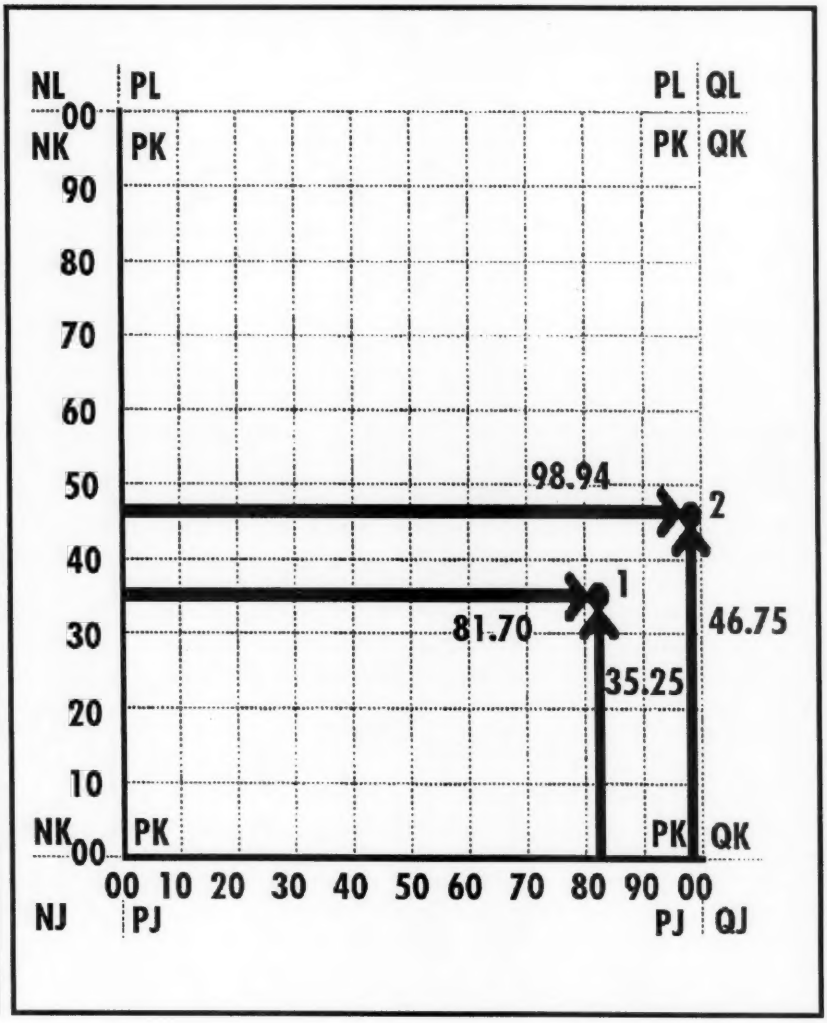

Figure 1. UTM Coordinates Graph

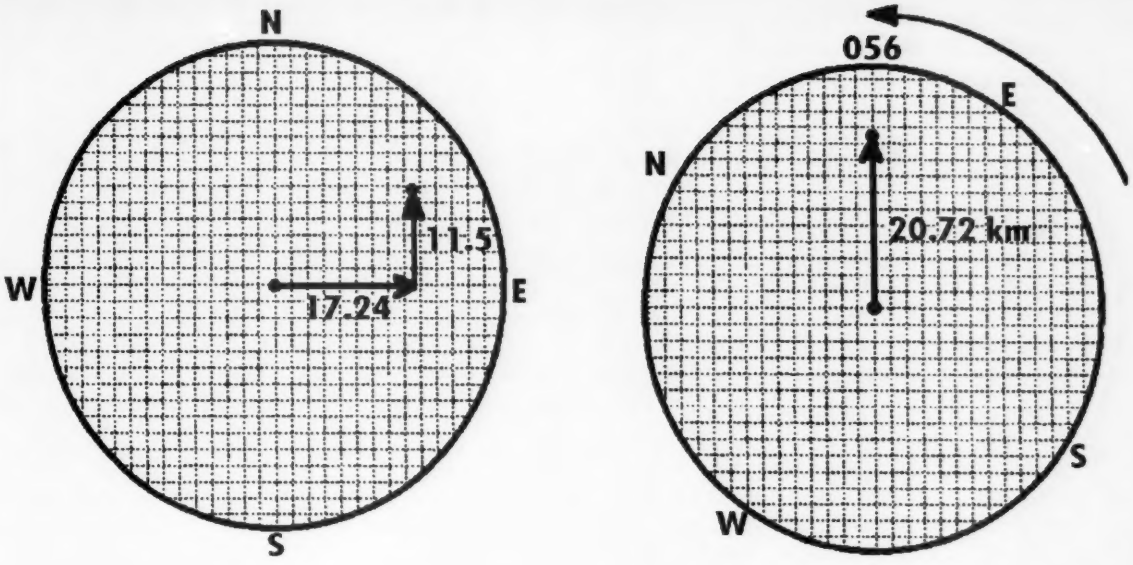

Figure 2. Wind Side of E-6/B Flight Computer

there is not enough room, make each square worth 2 km). Then, starting from that point, not the center, move up (north) 11.5 squares (be consistent if you doubled the value of the squares). Draw a dot to mark your final stopping point.

Step 4. Rotate the heading dial until the dot you made is above the center. Read the true course for this leg on the heading dial and count the squares from the center to find the length of the leg (again, be consistent).

In our previous example, the distance turns out to be 20.72 km and the course is 056 degrees.

Repeat Steps 1 through 4 for each leg of the flight.

Step 5. Turn over the E-6/B to the calculation side. Set the dial for your groundspeed in kilometers per hour and read leg times as you normally would. Remember, you can be more accurate with short distances if you use the seconds mark (36) rather than the hour mark. If you need to arrive at the next point at a certain time, back plan to determine takeoff time, or set time opposite distance on the E-6/B and read the necessary groundspeed. Once you have the time for the leg, use an accurate burn rate to calculate fuel for the leg. If you wish, you can wait until you get a total time for all legs at the same speed and figure total fuel.

In the example, the time for this leg at 100 knots groundspeed (185 km/hour (hr) is 6 minutes 43 seconds. The fuel required for this leg at a sample burn rate of 840 pound (lb)/hr is 94 pounds.

Step 6. Use the data effectively.

- Adjust the true course for your area to find magnetic course.
- If doppler-equipped, use groundspeed readout and "time-to-go" to adjust speed in flight.
- On the AH-64, one useful technique is for the lead aircraft to turn off the automated data subsystem (ADSS) during the en route portion of the mission so the pilot can view groundspeed directly in his symbology. (Remember to turn the switch back on for accurate weapon employment.)
- Do not round off times—errors will build up and defeat the purpose of your planning. If you calculated a takeoff time of 2137:12, then pull pitch at exactly 12 seconds—do not settle for 20.
- If taking off from a confined area, or if conditions require takeoff in other than the direction of the first leg, add 30 seconds to your first leg time. Otherwise, add 15 seconds to allow for acceleration and flight

form-up time. Start adjusting your speeds to make your times immediately after takeoff.

- Place a checkpoint at about 5 to 7 km before critical timing points (e.g., forward line of own troops (FLOT) crossing) to ensure accuracy.
- Use your fuel data accurately (figure 3).

Important Rules

- Always use destination minus origin.
- After subtracting, if you get a negative number, that means to move left (west) or down (south) as appropriate.
- The larger the area you use on your E-6/B wind dial, the more accurate you will be. Make each square worth 1/2 km to enlarge it or 2 km or more to shrink it as necessary, but do not make it any smaller than you have to. Be sure to be consistent with your values throughout that leg's calculations.

If crossing over the border of a 100 km grid square (changing grid letters), consider the difference in letters to mean 100 km for each letter. Remember that the letters I and O are not used and add 100 to the higher lettered component before subtracting (figure 4).

QK 0141 1510 to PK 8170 3420

To subtract, add a 1 to the component that is associated with the letter Q.

81.70	34.20
-101.41	-15.10
-19.71 km west	19.10 north

Distance = 27.4 km @ 314 degrees

Figure 4. Example of Crossing Grid Zones

Takeoff Fuel on Board	**2,150 lbs**
- Fuel required for route there	- 337 lbs
- Fuel required for route back	- 274 lbs
- Required reserve at cruise	- 280 lbs
= Fuel remaining on station	= 1,259 lbs
+ Fuel burn rate at hover (lbs/hr)	= [1+09 hrs] maximum time allowed on station

Figure 3. Example Of Fuel Data

If you have a scientific calculator with inverse tangent (could be labeled as INVerse TANgent, TAN^{-1}, or ATAN), you can be more accurate. Use the following steps when using a scientific calculator with inverse tangent:

- Subtract coordinates the same as before.
- Square each number, add the squares, and take the square root to get distance (Pythagorean theorem: distance = $\sqrt{x^2+y^2}$).
- Take the inverse tangent of $^{y}/_{x}$ to get the angle between the course and either 090 degrees or 270 degrees depending on whether the course is generally east or west. If the x-component is positive (east), then subtract the inverse tangent from 090 degrees. If the x-component is negative (west), then subtract the answer from 270 degrees. This method will give you true course.
- Divide the distance by ground speed in km/hr. This calculation will give you the hours of travel time. Multiply by 60 to get minutes and by 60 again to get seconds.
- Multiply time (in hours) by fuel burn rate to get pounds of fuel required.

Conclusion

After a little practice, you will find this procedure is not as hard as it might at first seem. Eventually, you will develop a feel for distance and heading that allows you to do rough calculations in your head. This can be very useful in flight. Consider the following situation:

You are flying on a mission and get a radio call to go immediately to the vicinity of PK 67 42 to provide suppressive fire in support of a unit under attack. You know your present position is near PK 58 62. That means you have to travel 9 km east and 20 km south. You realize that you have to go about twice as far south as east, so you tell the pilot to head south-southeast and he begins to turn. Now, you can flip the pages of your map and find the location you are looking for to navigate more precisely.

This intuitive feel for coordinates also makes it easier to catch mistakes that could send you off course.

I have written a computer program to plan flights from the airfield, but still do the calculations by hand in the field. I hope that more units will start using these methods for planning flights. Perhaps someday, Armywide, aviators will have a reputation for being where they are supposed to be, on time to the second. The units we support depend on this kind of reliability. ❐

Army OSA Aircraft Consolidate For Efficiency, Accessibility

Mr. Ned Christensen
Public Affairs Officer
Operational Support Airlift Command
Davison Army Airfield
Fort Belvoir, VA

Army Aviation's 50th anniversary became a historic year with the implementation of a new concept for organizing and operating an entire category of the Army's aircraft. A system was started in 1989 to centralize scheduling of the active Army's fixed-wing support aircraft. The system evolved into a new Army Aviation command responsible for overseeing those aircraft.

The Army's newest command, the U.S. Army Operational Support Airlift Command (OSAC), was activated 1 October 1992. The OSAC's mission is to consolidate all active Army OSA fixed-wing support aircraft based in the continental United States (CONUS). This reorganization allows Army aviation to provide top quality support airlift service to more customers while saving money, increasing accountability, and maintaining the highest degree of wartime readiness.

The OSAC headquarters is at Davison Army Airfield, Fort Belvoir, VA. The OSAC centralizes command and control, scheduling, operations, and maintenance of active Army OSA aircraft that were based at 67 installations across the country. The airplanes were controlled by local commanders, with no central coordination for scheduling aircraft or

tracking operation costs and maintenance.

Those aircraft are now based at 15 centralized locations selected for their proximity to many potential customers. They are centrally scheduled and controlled from command headquarters at Fort Belvoir. This system allows the OSAC fleet to operate much like a commercial airline, except an airplane only flies if it has a mission. Operating hours, flying hours, maintenance, and passenger load are centrally tracked for maximum efficiency and customer service. The system also allows for data collection to help determine what future OSA aircraft should look like as the fleet is modernized.

Efficiency Equals Access

This consolidation has a wide range of long-term, cost-saving, and modernization benefits. One immediate benefit is wider and easier access to the Army's passenger support airplanes. OSAC aircraft are available to all military and civilian Department of Defense (DOD) personnel traveling on official business. When aircraft were locally controlled, they were used primarily by installation commanders. Senior Army leaders are still frequent flyers on OSAC aircraft because of their frequent needs to travel, but centralized control of the aircraft makes a wider use of the fleet possible.

In the consolidation process, many installations lost aircraft that had been locally based, but local commanders still have ready access to those aircraft. Although OSA airplanes are based at only 15 locations, they still service all military installations. Centralization under the OSAC gives the command new ways to run a cost-effective and service-oriented airlift system.

One way is by combining missions with similar departure and arrival times and locations on the same aircraft, whenever possible. For example, if a mission is requested for three passengers to travel from Fort Hood, TX, to Washington, DC, and a separate request calls for three passengers to travel from Redstone Arsenal, AL, to Fort Meade, MD, OSAC scheduling often can combine the two missions on one airplane. Increasing passenger load decreases the relative cost of operating the aircraft and makes more aircraft available to other customers. Deadhead flights, while not eliminated, are minimized.

Centralization also provides alternatives to aircraft down for maintenance. When installations had aircraft, they often had only one. If the aircraft needed maintenance, it was grounded until it was repaired. With aircraft centrally scheduled and operated, if one aircraft needs maintenance, other aircraft usually will be available to support the mission.

In today's climate of joint services cooperation, the Army OSAC can increase access to aircraft by coordinating with the Air Force, Navy, and National Guard for mission support on their OSA aircraft, when necessary.

OSAC aircraft are available to all military and civilian DOD personnel traveling on official business.

Accessing The OSAC Fleet

Accessing airlift support starts with a request that includes the requested dates and times of departure and arrival, the airports to be used for departure and arrival, a complete passenger manifest, and departure and arrival points of contact to be notified of a mission change. The request can be in any format, but it must be for official business.

The request goes to the unit authorizing official—the person in a unit or activity who approves official business travel. Requests should be submitted at least 4 days before the departure date.

The unit authorizing official forwards the request to the installation validator, who is designated by the installation commander. The validator determines that the request is for official business and assigns it one of five priority urgency justification codes. The following priority codes are used to justify military air transportation:

- Priority 1 indicates airlift in response to a national emergency or for lifesaving pur-

poses. These conditions are most likely to apply in a wartime situation.

- Priority 2 applies when special mission constraints such as time or airport location cannot be met by a commercial carrier.
- Priority 3 allows for airlift support when classified material must be transported or discussed.
- Priority 4 permits team travel when team members must work together as a team while en route. This priority code applies only to groups that must work as a team on the airplane—a group traveling together to a common destination might not qualify.
- Priority 5 denotes a mission that could be done by commercial air, but military air is more cost effective. A group traveling together might not qualify as a team, but could get support if military air is cheaper than buying airline tickets.

After the validator processes the request and assigns it a priority code, he forwards it electronically to the OSAC scheduling section where it is evaluated based on priority and availability of aircraft and crews. The local validator is required to submit each request to the OSAC, whether or not he thinks it will be supported. If the mission is supported, the supporting flight detachment will make final coordination with the customer 1 or 2 days before the departure date.

If an emergency precludes requesting a flight through the normal procedure, OSAC support can still be requested through the Department of the Army Emergency Operations Center. It is important to coordinate emergency requests with the OSAC scheduling office simultaneously to ensure that an airplane and crew are standing by to fly the mission.

Space available passengers also are accommodated on OSAC aircraft if, of course, space is available. OSAC scheduling does not schedule Space-A flights, and installation commanders usually will provide for Space-A travel information. Travel arrangements typically are made through local airfield Base Operations.

Development Of The OSAC

The formation of the OSAC has been an evolutionary process that started about a decade ago with studies by the General Accounting Office and others into the efficiency of the armed services' operational support airlift programs. Out of those studies came the Centralized Army Aviation Support Office (CAASO), which was implemented at Davison Army Airfield in 1987 to monitor the use of OSAC aircraft. In 1989, CAASO became the sole scheduling center for active Army OSAC aircraft. The success of that effort laid the groundwork for completing the centralization process under the new command. Army Reserve OSA aircraft also are scheduled by the OSAC, and National Guard OSA assets soon will be brought under a similar system.

The studies that created the CAASO also mandated the consolidation of aircraft at fewer facilities and established wartime requirements for the number of aircraft in the OSAC fleet. OSAC assets were reduced from 300 to 225 fixed-wing support aircraft in the total Army, including all three components. Of those, 180 are used for OSA missions, with the remainder dedicated to training and research and development. Older, piston-driven aircraft have been replaced by more efficient turboprop models in the active duty component. The older aircraft are being phased out gradually. Fleet modernization efforts focus on the aircraft configurations that should be adopted for the next generation of OSA aircraft.

Command Assets

The active Army OSAC currently employs 77 fixed-wing aircraft, most of which are U-21 Ute and the newer C-12 Huron turboprop passenger airplanes. One Lear jet and three Gulfstream jets based at Andrews Air Force Base near Fort Belvoir give the Army organic worldwide transportation capability, while 27 UH-1 Iroquois and five UH-60 Black Hawk helicopters at Fort Belvoir provide priority air transport in the National Capital Region. Fixed-wing maintenance is done by a contractor logistics system with facilities at each detachment.

The OSAC brigade is a major subcommand of the U.S. Army Military District of Washington

(MDW), which is made up of three regional battalions; the Western Region, Fort Hood, TX; the Eastern Region, Fulton County Airport, Atlanta, GA; and the National Capital Region, collocated with brigade headquarters at Fort Belvoir.

The Western Region includes hub detachments at Fort Hood; Fort Sill, OK; Peterson Air Force Base, CO; Fort Leavenworth, KA; Fort Huachuca, AZ; Fort Irwin, CA; and Fort Lewis, WA. Eastern Region detachments are located at Atlanta; Fort Rucker, AL; Fort Bragg, NC; Fort Knox, KY; Langley Air Force Base, VA; Quad Cities Airport, Rock Island Arsenal, IL; and Stewart International Airport, West Point, NY. The National Capital Region headquarters is at Fort Belvoir and oversees three detachments. The Fixed-Wing Priority Air Transport detachment is most like the other detachments, with an inventory of seven C-12s. The Rotary-Wing Priority Air Transport detachment flies the only helicopters in the command. They use 27 UH-1s and five UH-60s to provide priority air transport in the National Capital Region. In addition, the detachment provides support to the air assault school and other training support for MDW soldiers. The U.S. Army Priority Air Transport detachment controls the Army's jet OSA aircraft in CONUS. Its primary mission is to transport senior military and civilian leaders internationally and over long distances in CONUS.

Long-term Opportunities

Centralization and automation of OSAC fleet scheduling and operations optimize fixed-wing support aircraft use for efficiency, cost effectiveness, and 24-hour availability. However, the current data collection and analysis have the potential to provide even greater benefits as the OSAC matures and fine tunes itself.

The new automated system can calculate whether an official business air travel mission can be most economically fulfilled on military or commercial aircraft. While OSA aircraft are available to all business travelers in the DOD, commercial carriers are often more cost effective. Automation allows OSAC schedulers to analyze all the needs associated with a mission and to factor in cost effectiveness as a primary consideration in assigning priority codes to a mission request.

Scheduling records make it possible to track flying hours nationwide to determine how aircraft can be best allocated so customer service remains a top priority along with efficient operation. Numbers and types of aircraft at the various detachment locations can be adjusted as supply and demand for support fluctuates. Entire hub detachments can be moved when and if documentation shows the need for major relocation of assets. This analysis is already underway, and some initial reallocation is being looked at.

Wartime Readiness

The wartime readiness requirement was the basis for centralizing OSA aircraft scheduling, and that requirement (more) remains the reason for maintaining an OSAC fleet. The OSAC enhances wartime readiness by providing a single activity through which the aircraft can be mobilized and deployed where they are needed most for national emergencies or disasters.

During peacetime, ongoing modernization efforts include central tracking of aircraft use that shows how the aircraft perform and how they could be improved. This analysis will play a large role in seeing that future aircraft acquired for operational support airlift will be those best suited for the purpose. Speed, range, size, efficiency, and the ability to take off and land on small airfields are all factors that will be looked at in future aircraft designs. With the aircraft on hand, the peacetime mission doubles as training time for flight crews. Central tracking enables monitoring of aircraft and personnel for wartime readiness.

Growing Pains

The OSAC is a new command, and as such, faces challenges and growing pains. Several detachments are moving into new facilities. Aircraft usage projections are being made in the environment of a rapidly changing and shrinking Army. Customers and staff are in a learning curve on how to use a new system.

The system is in place. With challenges come opportunities, and the OSAC is poised to provide safe, quality, and reliable transportation to official business DOD travelers for the next 50 years. ❐

ANVIS/HUD

An Operational and Safety Enhancement for Nap-of-the-Earth Night Flight

Mr. David Troxel
ANVIS/HUD Project Leader

and

Captain Andrew Chappell
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Project Manager
Night Vision and Electro-Optics
Fort Belvoir, VA

Introduction/Background

The aviator night vision imaging system (ANVIS)/heads-up display (HUD) system is designed to give aviators critical flight information superimposed on the outside visual scan image of the ANVIS night vision device. The system is electro-optical and overlays cockpit information by integrated graphics on the night vision scene. It gives the pilot and copilot critical, real-time, high-resolution flight and navigational information. Its primary purpose is to enhance flight safety and ease the crew workload. The system also reduces the need to divert pilots attention from outside the aircraft to inside the aircraft to monitor flight and navigational instruments.

System Description

The ANVIS/HUD acts as a sensory gathering device that takes various analog and digital aircraft sensor information into the signal data converter (data accumulator box). The system converts these data into symbology (such as altitude and airspeed), and transmits the information into an optical combiner, the display unit, that is

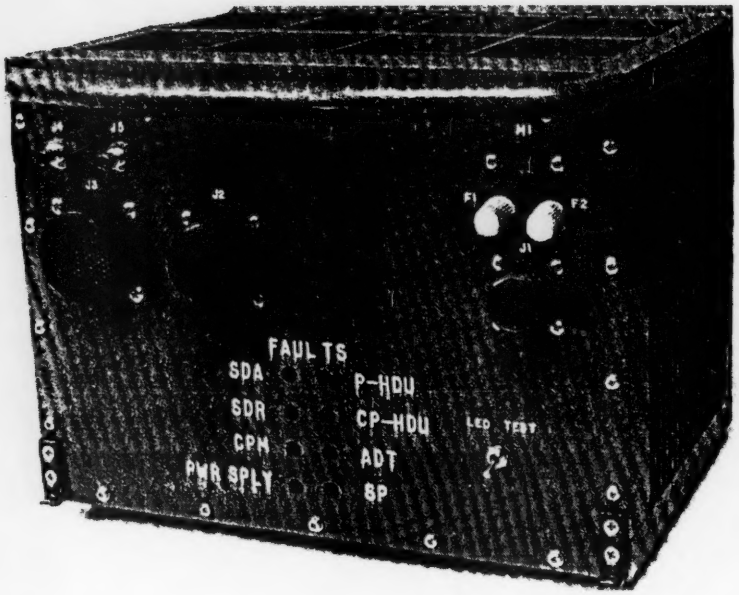

Figure 1. Signal Data Converter

overlaid onto the ANVIS scene. The resulting symbology overlay gives the aircraft crew an independent display of data obtained from one sensory gathering point.

The ANVIS/HUD system's official nomenclature is AN/AVS-7, which consists of an "A" and "B" kit. The "A" kit includes all the required mounting brackets, wiring, connectors, transducers, etc., to transfer instrumentation and navigational data to the "B " kit. The A kit is aircraft type specific and is designed and manufactured accordingly.

The B kit includes the signal data converter, the converter controller, and two display units. It is designed and manufactured to be 100 percent interchangeable among aircraft types UH-60A/L Black Hawk, OH-58A/C Kiowa, CH-47D Chinook, UH-1H/V Iroquois, and the AH-1F Cobra. Compatibility with other services aircraft include the Marine's UH-1N Twin Huey and the Navy's CH-46E Sea Knight.

The signal data converter (Figure 1) acts as a symbology generator and system processor. It weighs 13.1 pounds, and its dimensions are 7.8 inches by 10.6 inches by 7.6 inches.

The converter controller (Figure 2) is a control unit for pilot/copilot built-in-test (BIT) activation, symbology selection and placement, and intensity control. It weighs 1.1 pounds, and its dimensions are 2.7 inches by 5.7 inches by 3.7 inches.

The two display units (Figure 3) superimpose selected symbology onto the ANVIS scene using a stroke base system. Each weighs 8.5 ounces (including optional counter weight), and its dimensions are 4.5 inches by 2.5 inches by 1.5 inches.

System Characteristics and Capabilities

The following list gives the unique features and capabilities of the ANVIS/HUD:

- Independent pilot and copilot controls and displays. Contrast/intensity and on/off

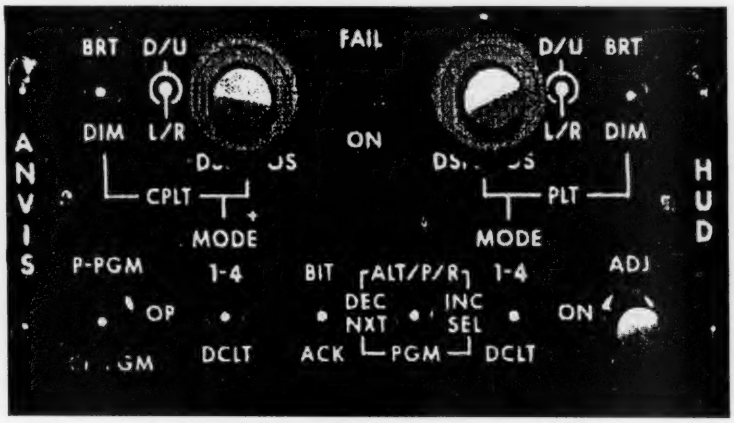

Figure 2. Converter Controller Unit

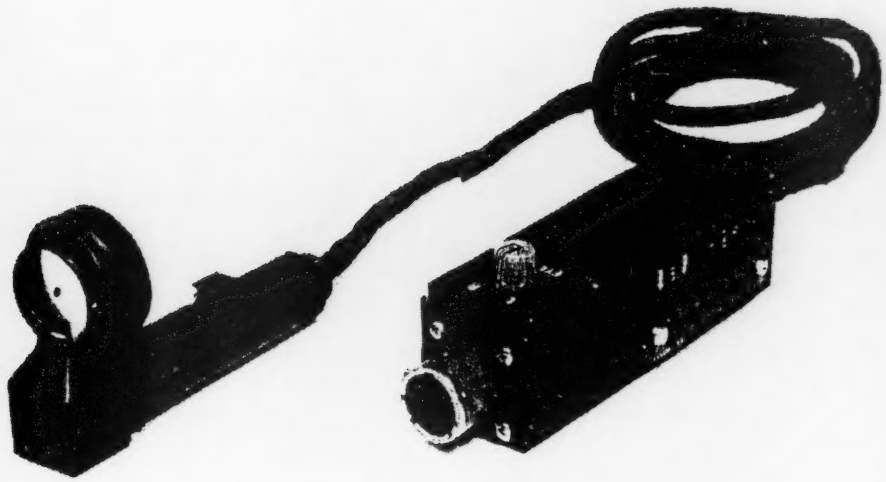

Figure 3. Display Unit

switches are adjusted independently by each crewmember.

- Display unit is optionally mounted on either left or right ANVIS objective lens.
- BIT diagnostics may be started by maintainers or crewmembers during ground operations or in-flight.
- Symbology field-of-view is 34 degrees.
- The system has four programmable modes (pages).
- Instantaneous switch-over [select/deselect (declutter)] capability. This capability gives the crewmember the capability to display all or no symbology.
- The declutter mode displays sufficient data for the pilot to maintain safe flight in a high workload or emergency condition. It will display airspeed, altitude (mean sea level [MSL]), torque, and attitude.
- Total system weight per airframe is approximately 36 pounds.

ANVIS/HUD Symbology

As part of the requirements document, the HUD symbology display must include, as a minimum, the following symbology: (See figure 4 for a composite of the symbology.)

- Attitude
- Altitude (MSL and above ground level [AGL])
- Waypoint/Distance
- Airspeed
- Vertical speed
- Cargo hook engagement
- Ground speed
- Torque setting(s)
- Hover (pitch/roll)
- Trim
- Compass heading
- Low altitude warning
- Engine temperature(s)
- Master caution/warning

Additional symbology for the AH-1F includes weapons site information and laser range finder. The added symbology for the UH-1N/CH-46E includes quadrant threat warning. The system incorporates future expansion to allow presentation of obstacle avoidance information and various modes to include hover, transition, cruise, targeting, and weapons delivery as referenced in Military Standard-1295(AV).

Reliability, Availability, and Maintainability (RAM)

ANVIS/HUD uses Army Aviation's three-level maintenance concept: Organizational (aviation unit maintenance [AVUM]), intermediate level (aviation intermediate maintenance [AVIM]), and depot level. There are no special tools or test equipment needed or required at AVUM/AVIM levels. And, perhaps one of the greatest

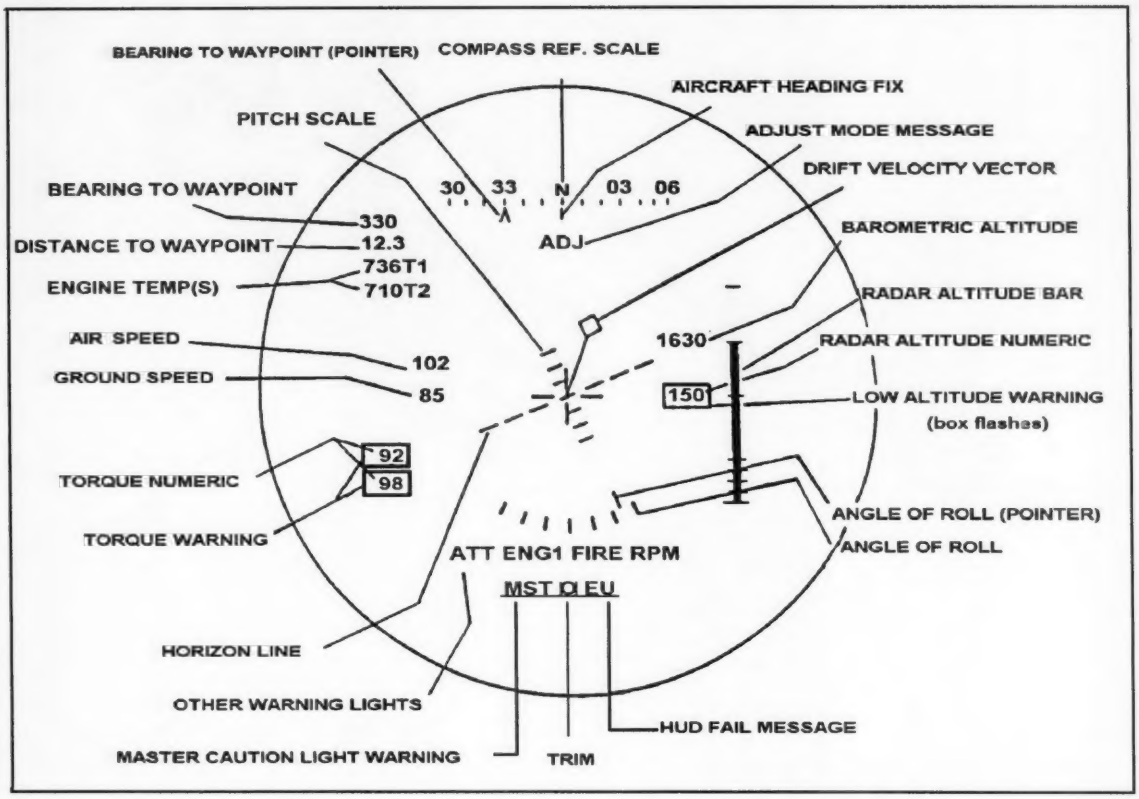

Figure 4. ANVIS/HUD master symbology display for UH-60 Black Hawk (composite of majority of symbols)

advantages is that the system requires no new military occupational specialty (MOS) for operation, maintenance, or support in the field. Figure 5 shows the integrated logistics support (ILS) flow for the ANVIS/HUD program.

AVUM operators and maintainers will detect equipment failure by using the system BIT. Line replaceable unit (LRU) replacement of failed components is authorized at the organizational level (to include card replacement). A 15-minute mean-time-to-repair (MTTR) is established and includes external cleaning, minor adjustments, knob replacement, and LRU removal and reinstallation.

AVIM activities will repair failed converter controllers. All other components are forwarded to depot. A 30-minute MTTR has been established at AVIM to include fault isolation and remove and replace fault modules.

Depot maintainers will have interim contractor support to help repair and replace LRUs. They will have appropriate test equipment on hand to simulate input conditions and isolate faulty LRUs and shop replaceable units (SRUs). Depot maintainers have a 60-minute MTTR and includes fault isolation of modules to identify faulty piece parts and repair of modules and systems. The ANVIS/HUD system is required to have a 400-hour mean-time-before-failure (MTBF).

Current Program Status

The ANVIS/HUD program is unique because it requires a tremendous amount of cooperation to develop, procure, field, and support the system in the field. Two major commands, U.S. Army Communications-Electronics

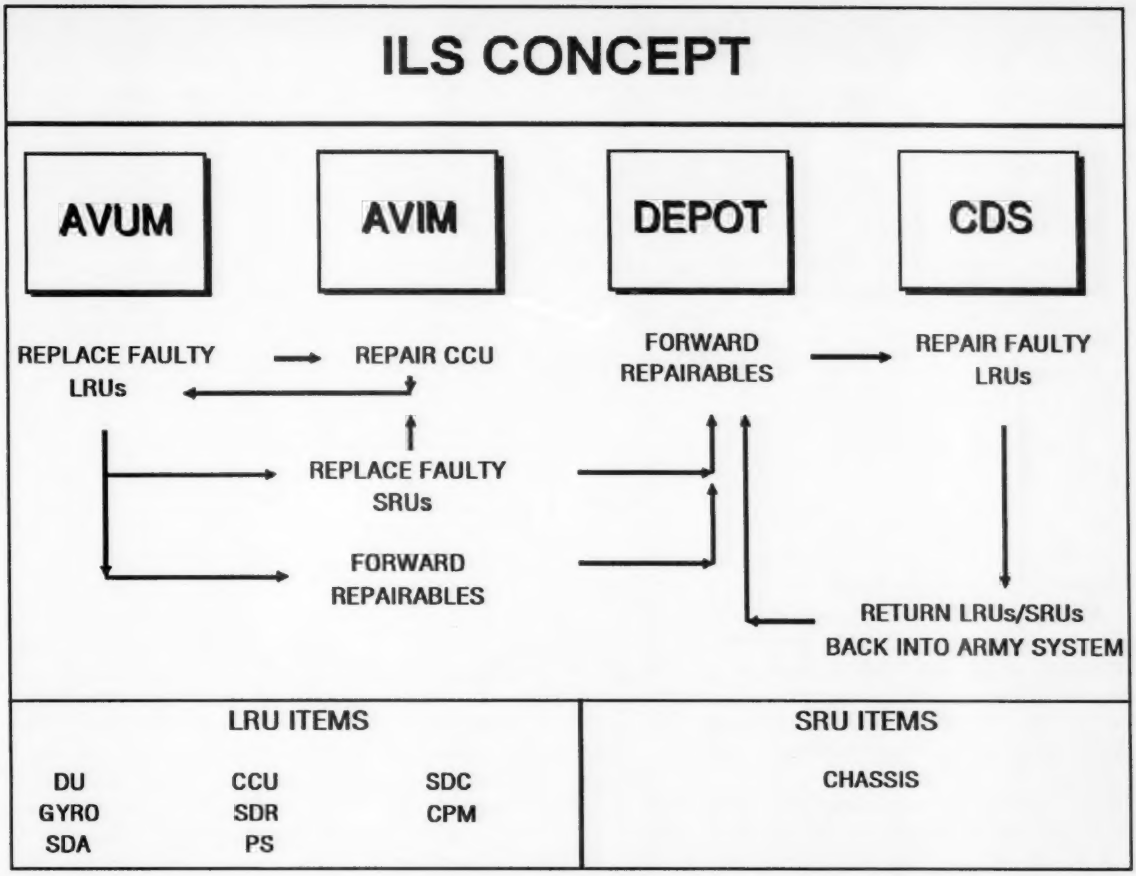

Figure 5. Integrated Logistics Support

Command (CECOM), Fort Monmouth, NJ, and U.S. Army Aviation and Troop Command (ATCOM), St. Louis, MO, and 10 project manager (PM) offices are involved in providing this capability to the U.S. Army and U.S. Marine Corps.

PM-Night Vision and Electro-Optics (PM-NVEO), Fort Belvoir, VA, is the program sponsor and has overall responsibility for system integration. PM-NVEO is also the official military point of contact for ANVIS/HUD. Other integral players in the program are PM-Aviation Electronic Combat (PM-AEC); PM-Utility Helicopters UH-60A/L, UH-1H/V, UH-1N; PM-Cargo Helicopters CH-47D and CH-46E; PM-Scout Helicopter OH-58A/C; and PM-Attack Helicopter AH-1F, ATCOM.

PM-AEC is responsible for coordinating the U.S. Army aircraft PMs' position on aircraft integration issues. All aircraft PMs have a vital role to validate aircraft interface/documentation modifications.

The ANVIS/HUD program is scheduled for installation on the UH-60 starting first quarter, fiscal year (FY) 1994, and on the CH-47D in second quarter, FY 1994. There is currently a 5-year procurement plan for the active Army, Reserve, and National Guard forces. ❐

Proponency Transfer?

There is much talk about an upcoming proponency transfer of four military occupational specialty codes (MOSCs). These four MOSCs are 68L (avionic communications equipment repairer), 68Q (avionic flight systems repairer), 68R (avionic radar repairer), and 93D (air traffic control (ATC) equipment repairer). How will this transfer affect the soldiers in these MOSCs? Why are these four MOSCs being transferred to the Ordnance Branch? First, let us look at why this is being done.

These four MOSCs are all low-density. With the drawdown in full swing, they are expected to become even lower. The number of soldiers in these four MOSCs totals about 1,352 soldiers—285 93Ds, 384 68Ls, 275 68Qs, and 408 68Rs. By 1995 the total population of these four MOSCs will be about 1,042 soldiers. Managing these low-density MOSCs is becoming unfair to the soldier. The Ordnance Branch is best suited to develop a more equitable personnel system for these four component repair MOSCs. Pin-on-point-to-promotion is an excellent example to gauge how healthy an MOS is versus the Army average. MOSC 68P is currently the capper MOS for the 68L, Q, and R MOSs; and the average time to pin on sergeant first class (SFC) is 13.6 years of service. The Army average to pin on SFC is 12.8. The SFC 68Ps are almost 10 months behind the Army average pin-on-time for promotion. MOS 93D is dropping to less than 200 soon, and this causes a major personnel management issue. You should have at least 200 soldiers in an MOS to qualify as an MOS; less than 200 is traditionally an additional skill identifier (ASI). The Ordnance Branch will attempt to keep the 93Ds as a separate MOS merging with other MOSCs in the future. We were unable to come up with a viable career progression within Aviation MOSCs and still maintain the 93D as a separate MOSC.

Now, how will these four MOSC transfers affect the soldier? This transfer should only benefit the soldier. The Ordnance Branch can merge these MOSCs with other MOSCs that have a commonality of tasks. By increasing the density of these MOSCs, the most qualified soldier should have a better opportunity for promotion. It also gives the Army a broader base to select for promotion and increase the quality of the noncommissioned officer (NCO) Corps. The impact on the individual soldier will be small. These four MOSCs will be converted, most likely, to career management field (CMF) 35; this is a paperwork issue only. The soldier will not have to initiate anything. The work these soldiers are doing will remain the same—the ATC equipment repairer will repair ATC equipment, the avionics repairer will repair avionics equipment.

All the soldiers affected by this branch proponency change are still vital to the readiness of Aviation. This change is required to use the soldiers better as the Army and Aviation reduce personnel assets. For further information, please write or call SGM Maurice, Aviation Proponency Office, ATZQ-AP, Fort Rucker, Alabama 36362-5000, DSN 558-2359/4313.

Aviation Proponency Office

Send matters concerning aviation personnel notes to: Chief, Aviation Proponency Office, ATTN: ATZQ-AP, Fort Rucker, AL 36362-5000; or call DSN 558-5706/2359 or commercial 205-5706-2359.

Treaty on Open Skies

by Mr. Robert C. Cole

The Open Skies Treaty may affect your airspace on short notice. Yes, there is such a treaty that came about on 24 March 1992, when the United States, with 24 other countries, signed the treaty document. This treaty is an international effort to promote openness of military forces and activities. As a signatory, the United States is obligated to accept overflights of its entire national territory by other treaty member states using aircraft equipped with an approved set of sensors.

The Open Skies Treaty covers all national territory, including territorial waters and islands, of signatory states. The United States and Russia/Belarus (as a group) will each have a passive quota allocation of up to 42 flights per year. However, during the phasing-in period (from entry into force [EIF] until 31 December of the third year following EIF), they will be only obliged to receive up to 31 (i.e., 75 percent of 42) flights. During the first year plus of the Treaty, the United States will conduct 9 active observation flights and Russia/Belarus will conduct 26 active observation flights annually.

Treaty provisions state that "open skies" flights take precedence over regular air traffic and allow flights through **all** special use airspace (SUA). The only exceptions may be flights over the White House and during the space shuttle launch or recovery operations. The United States must facilitate the conduct of these observation flights. Although the treaty allows a degree of negotiation over proposed flight plans, observing parties **are not obligated** to accept other proposals. To facilitate the conduct of these flights, **using** agencies are expected to release the affected airspace to the **controlling** agency.

Interruptions of ongoing operations within certain areas to be overflown can affect program scheduling and cost. Accordingly, the four services have proposed and are pursuing the following as a workable solution for airspace management:

The controlling agency (Air Route Traffic Control Center) will notify the using agency not later than 15 minutes before an "open skies" flight arrival at the SUA area boundary; the using agency will then stop or cancel ongoing activity and transfer control of the airspace to the Federal Aviation Administration (FAA). The controlling agency will return the airspace to the using agency not later than 15 minutes after the "open skies" flight departs the affected airspace.

Initial notification of an "open skies" flight will be received no earlier than 24 hours before the proposed flight. Upon receipt of this notification, information will be passed by the FAA to all activities affected by the planned route of flight for planning purposes. Figure 1 shows the timeline.

Mr. Cole is an air traffic control specialist assigned to the U.S. Army Aeronautical Services Agency, Alexandria, VA.

U.S. Army Aeronautical Services Agency

USAASA invites your questions and comments and may be contacted at DSN 284-7773/7984 or write to: Commander, U.S. Army Aeronautical Services Agency, ATTN: MOAS-AI, Cameron Station, Alexandria, VA 22304-5050

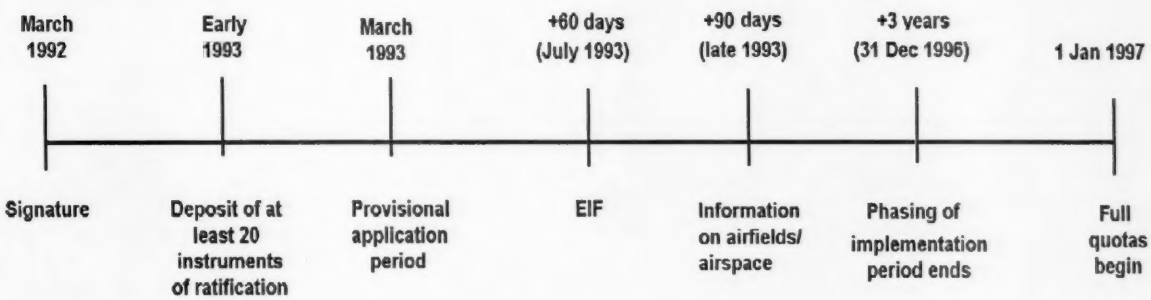

Figure 1. Tenative Entry Into Force Timeline

Nondestructive Inspection—A Maintenance Multiplier

by Mr. Finnis J. Hollis

Nondestructive inspection (NDI) will save money, raise operational readiness rates, increase safety-of-flight, and cure pimples. A good case can be made for three of these four claims. In today's environment of budget cuts, personnel shortages, and increasingly complex aircraft, every commander should be interested in NDI.

NDI is a means of detecting flaws that can develop with no external indication. All aircraft technical manuals require some amount of NDI. The benefits of NDI to a unit are improved availability, reduced Class IX costs through more "on condition" repair, and increased safety through better detection of faults. Further, the ease and speed of inspection, when compared with traditional methods, should mean less nonmission-capable time.

Unfortunately, not all units have access to the type of NDI required or to personnel trained for those techniques that are available. Schoolhouse surveys of Basic Noncommissioned Officer Course (BNCOC) students show that units currently respond to these shortfalls by contracting the tests at great expense, using unproven methods (e.g., hospital X-ray), and replacing components without inspection. None of these alternatives are acceptable in today's environment.

In response, the U.S. Army Aviation Logistics School (USAALS), Fort Eustis, VA, has taken a new look at the equipment requirements and will develop a training strategy to support it. Future strategy may call for elimination of the additional skill identifier (ASI) N2 and inclusion of training in resident courses, or may choose to continue using the ASI N2.

Equipment

Today, the Army owns only dye penetrant and magnetic particle equipment. Portable aviation intermediate maintenance/aviation unit maintenance (AVIM/AVUM) NDI technology that is commercially available includes magnetic particle, dye penetrant, ultrasound/harmonic bond, X-ray, and eddy current techniques. Each is used for a particular type of material and for particular flaws. The Army's techniques, while useful, do not meet all of our aircrafts' technical manual requirements. They are neither portable or inexpensive, thereby limiting their availability in the field. There are other drawbacks as well.

Dye penetrant is time-consuming, requires metal to be stripped of paint, creates a hazardous materiel disposal problem, and will detect only surface flaws. The magnetic particle machine is so large it is found only at major fixed facilities. Neither technique can be used to inspect composite materials, and neither responds to technical manual requirements for X-ray inspection. Because they are the only techniques available, they are used on articles that can be better tested by other techniques.

The U.S. Army Materiel Command (AMC), Alexandria, VA, is purchasing commercial, briefcase-size, affordable kits to do ultrasound/harmonic bond, eddy current, and X-ray tests. These kits are due to be fielded at the AVIM level in fiscal year (FY) 1995 and will do all AVUM- and AVIM-level tests required by technical manuals.

Training

Full NDI qualification is awarded through the ASI N2 course taught at Chanute Air Force Base, Rantoul, IL, which will move to Naval Air Station, Millington, TN, in FY 1994. Students at the career management field 67 BNCOC, taught at USAALS, are qualified in dye penetrant and magnetic particle techniques. The ASI course trains soldiers to use the new items being procured by AMC. However, graduates of the training may be assigned without regard for the ASI, and some units may have no qualified soldiers available for the equipment even when it is available.

New equipment training (NET) will be given upon fielding, and the NET team will cover how to do the tests and evaluate the results. The revised strategy will ensure that every unit has trained personnel available to support NDI requirements.

When the new NDI equipment is combined with the equipment that is already fielded and the revised training strategy is in place, field units will have the expertise and tools they need to increase safety, improve readiness, and save money. Safety, readiness, and economy are things every commander can live with. NDI is a tool aviation cannot live without.

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U.S. Army Aviation Logistics School

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ATC—Past, Present, and Future

by Lieutenant Colonel Fred E. Brown
and
Mr. Donald P. Clark

Mayday! Mayday! Eagle ground-controlled approach, this is Army 21825, 12 miles southeast of the airfield, declaring emergency!

This urgent radio call is repeated often to Army air traffic control (ATC). The trained professional Army controller typically responds in a calm, reassuring manner. The controller gives the pilot of an aircraft in distress essential information and navigational guidance. Often, Army controllers must improvise and provide their services using antiquated equipment and with limited support.

ATC is an integral part of the Army Aviation mission in the training environment, in the National Airspace System (NAS), and in combat. The combat ATC mission is to provide air traffic services (ATS) such as communication and navigational guidance at terminal airfields and in the area of operations.

The ATC services are identical wherever they are performed, but the equipment and environment changes with each location. Army controllers must have the flexibility to accomplish their missions while training, providing services in the U.S. NAS and worldwide host-nation systems, and then transition into combat roles when dictated. Historical and projected air traffic figures show that air traffic activity will continue to increase worldwide. The AirLand Battle doctrine relies heavily on air power, as witnessed in Operation Just Cause and Desert Storm. These trends point to an expanded need for ATC and increased navigational capabilities. Army ATC must maintain quality personnel and equipment to provide the best ATS in the world.

During Operation Desert Storm, the actions of two controllers on separate occasions saved the destruction of a UH-60 Black Hawk on a collision course with an uncontrolled aircraft and a UH-1 Iroquois attempting to land in zero visibility conditions. The ATC is a combat multiplier in terms of preserving the aircraft and crews for combat missions.

The two safe aviation via exceptional service in Desert Storm not only saved the aircraft with a combined cost of approximately $21 million, but also saved the crews and preserved the mission capability of the aircraft. The needless loss of two aircraft could have severely hampered the aviation mission.

This type of service is essential to allow aviators to complete their missions and return safely. Army ATC continues to provide for safe, orderly, and expeditious handling of air traffic supporting Army Aviation's worldwide mission.

Controllers could provide even more efficient services with modernized equipment. Most of the ATC systems in the current inventory have far exceeded their intended life cycles and are kept operating by the intensive efforts of exceptional maintenance technicians. However, recent changes in the ATC management structure have provided opportunity for improvement.

This article gives the history of the air traffic controller and ATC equipment. It also tells about some key organizations that are or have been a part of ATC.

After the formation of the U.S. Air Force (AF) and before 1955, Army ATC was nonexistent because the Army had only a few aircraft used as artillery spotters, medical evacuations, and observers. The ATC services were provided by the AF, Navy, or civilian personnel at fixed-base airfields. At the inception of the Vietnam conflict, contract civilians were hired to provide ATC services at Army airfields (AAFs).

Escalation of the war and the increasing use of Army aircraft created the need for large AAFs and trained Army controllers. The first Army ATC training was conducted by the AF at Keesler AF Base, MS, commencing in 1955. During Vietnam, the number of Army aircraft grew significantly and the doctrine of air mobility evolved, giving Army Aviation a real warfighting capability. To provide ATC services, the Army used equipment inherited from the AF and Navy, including radar and communications equipment developed in the 1940s. Initially, Army ATC personnel and equipment were assigned to combat aviation units until the air traffic regulation company table(s) of organization and equipment (TOE) was developed to support a combat theater.

As the need for controllers grew, the Army opened its own ATC school at Fort Rucker, AL, in 1969. In the early 1970s, the rapid increase in Army ATC requirements created a need for centralized control over equipment development, configuration management, and procurement.

To satisfy that need, the Product Manager-Navigation and Control (PM-NAVCON) was chartered to manage tactical navigation and ATC projects. The PM-NAVCON developed and fielded current ATC systems including the AN/TSC-61, flight operation central; AN/TSQ-71, landing control central; AN/TSQ-97, man-portable tower; AN/TSW-7A, high density tower; and the AN/TRN-30, nondirectional beacon.

As the Vietnam era drew to a close it became necessary to streamline and centralize the management of Army ATC. The 1973 study entitled Systems Approach to the Acquisition, Maintenance, and Operation of ATC and Navigation Facilities, or The SAMOAN Study, recommended consolidating Army fixed-base ATC under one command. The U.S. Army Air Traffic Control Activity (USAATCA) was formed in 1973 at Fort Huachuca, AZ. The USAATCA was subordinate to the U.S. Army Communications Command, which today is the U.S. Army Information Systems Command (ISC).

The USAATCA provided an ATC PM at the 0-6 level within the framework of a stovepipe organization responsible for all aspects of Army ATC management including research and development, acquisition, and command and control. Fixed-base ATC assets were assigned to table of distribution and allowances (TDA) ISC units at posts, camps, and stations. The ATC equipment was purchased and installed by ISC, but became an airfield asset after installation. Airfields were operated by the post or garrison commander, and ATC units under ISC supported the airfield commander with ATC and equipment maintenance.

In 1981, the PM-NAVCON was deprojectized and the responsibility for tactical ATC equipment development shifted to the ISC. Tactical ATC personnel and equipment were assigned to ATC battalions under tactical signal commands.

In 1982, the U.S. Army ATC Combat Support Activity, 7th Signal Activity, 7th Signal Command was formed at Fort Ritchie, MD. The new activity managed the two continental United States (CONUS)-based ATC battalions and the TOE maintenance company and provided staff management of fixed-base ATC facilities within CONUS.

In 1983, the Aviation Branch was formed as a combat arm, and aviation support functions were gradually incorporated into the branch. The ATC part became a part of the Aviation Branch by direction of General Carl E. Vuono, then Deputy Chief of Staff for the Army, in 1985.

In October of 1986, USAATCA was moved from ISC, Fort Huachuca, to Fort Rucker, AL, and became a U.S. Army Training and Doctrine Command (TRADOC) asset. The ATC combat-support activity was deactivated, transferred to U.S. Army Forces Command (FORSCOM), and reactivated as a staff element of FORSCOM Aviation without command and control. This transfer of responsibility for Army ATC originally included the premise that USAATCA would become a field operating agency under the Deputy Chief of Staff for Operations and Plans at the Department of the Army, but that concept never happened.

After the transfer, USAATCA retained responsibility for Army ATC operations, policy and procedures, ATC equipment requirements, and equipment program funding. Tactical ATC units were assigned to the major Army commands, and TDA ATC assets were assigned to the post aviation units. The ISC retained the responsibility for ATC equipment including research and development; procurement; ownership of equipment; procedures to engineer, furnish, install, and test; and overall project management.

In 1989, TRADOC recognized the ATC transfer plan was incomplete because ATC program funding, normally a U.S. Army Materiel Command function, was not a mission of TRADOC. Therefore, the transfer was not treated as a command priority.

This long void in materiel management from the time PM-NAVCON was terminated until PM-ATC was formed left ATC behind the power curve in equipment and systems acquisition. As a result, the controllers had to use antiquated, maintenance-intensive equipment to perform these essential services. The Army Council of Colonels, recognizing this shortcoming in ATC materiel management, approved forming a PM for ATC as part of U.S. Army Aviation Systems Command, St. Louis, MO, (now U.S. Army Aviation and Troop Command [ATCOM]), in 1989.

The PM-ATC was formed in December 1990, with a PM in St. Louis, MO, and Deputy PM assigned to Fort Monmouth, NJ. The materiel development functions and associated personnel of ISC, along with scheduling and funding-function personnel from USAATCA, were transferred to ATCOM to form the PM-ATC.

Today, the PM-ATC and the USAATCA functions remaining at Fort Rucker are working together to establish requirements and acquire vitally needed enhancements and replacements for the antiquated ATC systems that are currently fielded. Under the management of PM-ATC (which is supporting requirements generated from USAATCA), four new tactical ATC systems have been placed in the acquisition cycle. Studies are under way to plan a comprehensive system upgrade for the future, including tactical, fixed-base, and NAS facilities as well as Army airspace command and control equipment. Programs are ongoing to replace the fixed-base surveillance radars and the communications switching systems in the towers and radars.

There is also an effort to replace the tactical and fixed-base radar systems with one common system. The Army has 37 ATC facilities in CONUS that interface with the Federal Aviation Administration's NAS facilities. To maintain NAS interoperability, these facilities will be modernized as part of the Department of Defense-NAS pro-

gram managed for the military services by the Electronics System Division, Hanscom Air Force Base, MA.

Considering the great expense of today's modern aircraft, the loss of one due to unavailability of appropriate ATC services would be very tragic. In perspective, the cost of one saved AH-64 aircraft would pay for a substantial portion of the update of ATC tactical systems. The PM-ATC is committed to keeping ATC systems viable and providing the Army Aviation community with the best ATC services possible. Look for future articles on PM-ATC current and planned initiatives for the acquisition and fielding of tactical, fixed-base, and airspace management ATC systems.

LTC Brown and Mr. Clark are assigned to the U.S. Army Air Traffic Control Activity, Fort Rucker, AL.

U.S. Army Air Traffic Control Activity

Readers may address matters concerning air traffic control to: Commander, USAAVNC, ATTN: ATZQ-ATC-MO, Fort Rucker, AL 36362-5265.

Continued from page 65.

Selective reenlistment bonuses (SRBs) are being considered for some Aviation MOS codes (MOSCs). The voluntary early transition and voluntary separation incentive/special separation bonus programs initially gave field commanders authority to release soldiers from active duty. This action led to the release of soldiers in some MOSs that, combined with a reduction in training, has created shortages, mainly at Skill Level 1. These programs are now being managed at U.S. Army Total Personnel Command, where the overall effects can be seen more readily. meanwhile, soldiers reenlisting in these shortage MOSs may reap the benefits of these SRBs.

Recently, the Aviation Branch was notified that the U.S. Army Combined Arms Support Command (CASCOM) concurred with a Joint Working Group recommendation that MOSs 68L (avionic communications equipment repairer), 68Q (avionic flight systems repairer), 68R (avionic radar repairer) and 93D (air traffic control equipment repairer) be moved from the Aviation Branch to the Ordnance Branch. CASCOM chose the Ordnance Branch based on commonality of tasks. This move will result in these low density MOSs being managed with other "bench repairers" and enhance career opportunities for these soldiers. This action also will require the relocation of the basic noncommissioned officer course (BNCOC) and advanced noncommissioned officer course to align this training with the advanced individual training (AIT) at Fort Gordon, GA. This realignment of MOSCs will not affect MOS 68N (Avionic Mechanic), which will remain with the Aviation Branch, aligned with component repairers.

Similarly, the BNCOC training for MOSs 67N (UH-1 Iroquois repairer) and 67V (OH-58A/C repairer) is being studied for relocation to Fort Rucker where the AIT for these MOSCs is trained.

The overall trend in the Army, and the Aviation Branch in particular, is a reduction in the number of MOSs and additional skill identifiers (ASIs). With the reduction in the number of soldiers in the Army, we have to have soldiers who can perform a broader variety of tasks. We have to diversify our soldiers, reversing the trend of specialization we have used in the past. This action will be done in the Aviation Branch by consolidating tasks, where possible, to eliminate as many MOSs and ASIs as practical. An example is the impending modification of the AH-64 Apache to the Longbow configuration. Current plans call for incorporating the required multiple skills into the basic MOS training, rather than implementing another ASI.

We are dedicated to staying on top of current issues and making the transition into our future Army as smooth as possible. We want to develop a structure that allows progression for the enlisted force. ❐

U.S. Army Class A Aviation Flight Mishaps

Fiscal Year	Number	Flying Hours	Rate	Army Fatalities	Total Cost (in millions)
FY 92 (through 28 February)	9	500,514	1.80	4	$35.2
FY 93 (through 28 February)	15	485,143 (estimated)	3.09	16	$69.4

AIHS

by Ms. Mary Mueller

The Aircrew Integrated Helmet System (AIHS) has been under development since 1988. During the first months of 1993, the AIHS underwent its first operational test at Fort Hood, TX. Aviators from the 1st Cavalry Division and 6th Cavalry Brigade (Air Combat), Fort Hood, exchanged their current issue flight helmets for the Darth Vader looking AHIS while deployed in a realistic operational environment.

"We are testing the AHIS to determine if it allows the aircrews to perform their mission and if it interfaces with the aircraft systems and safety devices," said Chief Warrant Officer 4 R. G. Rhoades, AHIS test officer.

The AHIS is designed to provide protection for crewmembers while performing aircrew duties during operational tactical missions. It also provides a helmet of modular design that meets the compatibility, interoperability, and reliability requirements to link and activate the ancillary devices required in mission activities of existing and future advanced aircraft.

Aircrew Integrated Helmet System (photo by Ms. Mary Mueller)

AHIS consists of the helmet shell, liners, a thermal plastic liner, air plenum and hose connector, chin strap, communications headphones and microphone, and a standard dual visor. The commonality of the AIHS components allows aircrews to configure the basic helmet to fit the needs of their specific aircraft and mission.

The Aviation Test Directorate, U.S. Army Test and Experimentation Command (TEXCOM), test team collected data on the AIHS used in each type of Army rotary-wing aircraft, except the AH-64 Apache. The components necessary for the Apache are still in development and should be available for operational testing in 1994.

For 5 weeks the test aircrews underwent a planned and controlled scenario that took them from simulators, to static exercises, to live-fire gunnery. Valuable data were collected from every aspect of the individual's performance and from the user's perspective.

Upon completion of the test, TEXCOM professionals reduced the large amount of data collected into a manageable form and prepared a final test report for the materiel developer—Program Manager, Aviation Life Support Equipment, St. Louis, MO. The operational test results will then be combined with the data from all previous tests to formulate a recommendation for a low-rate initial production decision.

Ms. Mueller is assigned to the Public Affairs Office, Test and Experimentation Command, Fort Hood, TX.

Test and Experimentation Command

Readers may address matters concerning test and experimentation to: Headquarters, TEXCOM, ATTN: CSTE-TCS-PAO, Fort Hood, TX 76544-5065

Command Sergeant Major Fredy Finch Jr

Changes In Enlisted Personnel Management

The Aviation Branch is currently developing some extensive initiatives that affect almost all enlisted soldiers. These initiatives are driven by the drawdown of soldier strength, changes in retention control points (RCPs), and organization restructure programs. Change is always cumbersome, both to manage and to execute. This article provides an update on these vital issues to Aviation soldiers.

One initiative is a plan for consolidating military occupational specialties (MOSs) by family of aircraft. An observation/scout repairer usually moves to an attack aircraft MOS when promoted to sergeant first class (SFC). Under the new plan, he will stay with the observation/scout family through the SFC level. An attack aircraft family repairer also will stay with attack aircraft through the SFC level. Currently the 67V MOS (OH-58A/C Kiowa repairer) goes to the staff sergeant (SSG) level. At the SFC level, the soldier becomes a 67Y (AH-1 Cobra repairer). The 67S (OH-58D repairer) also goes to the SSG level, then becomes a 67R (AH-64 Apache repairer) at the SFC level.

Another initiative under development is a leadership/technical track for aviation soldiers. Under this system, each soldier at the SFC level would be tracked. Those selected for the leadership track would become platoon sergeants, first sergeants (1SGs), etc. Those selected for the technical track would perform or supervise aviation maintenance. Currently, about 80 percent of our most experienced soldiers are taken out of the technical side at the SFC/master sergeant (MSG)/sergeant major (SGM) level and put into leadership positions. This proposal will provide a means of retaining these experienced soldiers on the technical side.

A change to AR 611-201 has been proposed that recommends merging MOS 93C (air traffic control operator) into MOS 93P (aviation operations specialist) at the MSG level. This change, if approved, will benefit 93C personnel by increasing their potential for promotion. It also will benefit 93P personnel by infusing some top quality soldiers in Aviation operations. Currently, 93C personnel are required to reclassify to 93P if selected for promotion to MSG or SGM.

A recently approved change to AR 611-201 also concerns MOS 93P. This change deletes the requirement for mandatory formal training to be awarded the MOS. This change allows the U.S. Army Aviation Center to award the MOS based on other criteria, i.e., completion of correspondence courses, on-the-job training, etc. This change has the potential to save valuable training dollars.

MOS 93B (aeroscout observer) is currently being revised to add some OH-58A/C maintenance skills. Additionally, the MOS will be rolled into career management field (CMF) 67. Plans call for adding OH-58D skills to the training as the OH-58A/C aircraft leave the inventory. The result will be the reclassification of these soldiers to MOS 67S when the OH-58A/C are gone. This revision in training will benefit commanders by enhancing unit maintenance and will result in better use of these soldiers. It also will provide a clearer career progression pattern for the aeroscout observer.

The following general statistics show the percent of current authorizations filled, by CMF and skill level. Percentages shown reflect total inventory and not distributable percentages.

Skill Level	CMF 67	CMF 93
1	80%	82%
2	100%	105%
3	99%	98%
4	104%	101%
5	82%	88%

Continued on page 63.

Army's First Aerial In-flight Refueling

First time ever (1985), a U.S. Army CH-47 Chinook was refueled in flight. Refueling was from an Air Force HC-130.

First time (1988) a tandem rotor production helicopter (CH-47) was qualified for in-flight fuel transfer.